# WIRE AND WIRE PRODUCTS

MAY 1951

*Producing*
THROUGHOUT THE WIRE INDUSTRY

MOTOBLOX®

*Vaughn*®

**WIRE DRAWING MACHINERY**

The outstanding performance of Vaughn Machinery on high-volume wire-drawing schedules is your assurance of dependability in meeting the most urgent production demands—*tomorrow as well as today.* May we consult on your needs?

**THE VAUGHN MACHINERY COMPANY**
CUYAHOGA FALLS, OHIO, U.S.A.

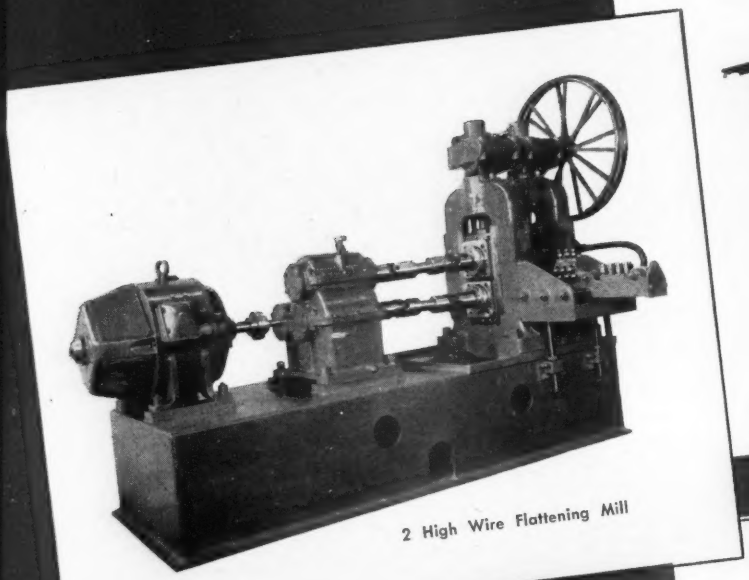
COMPLETE COLD DRAWING EQUIPMENT—Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.


OFFICIAL PUBLICATION OF THE WIRE ASSOCIATION

# Wean

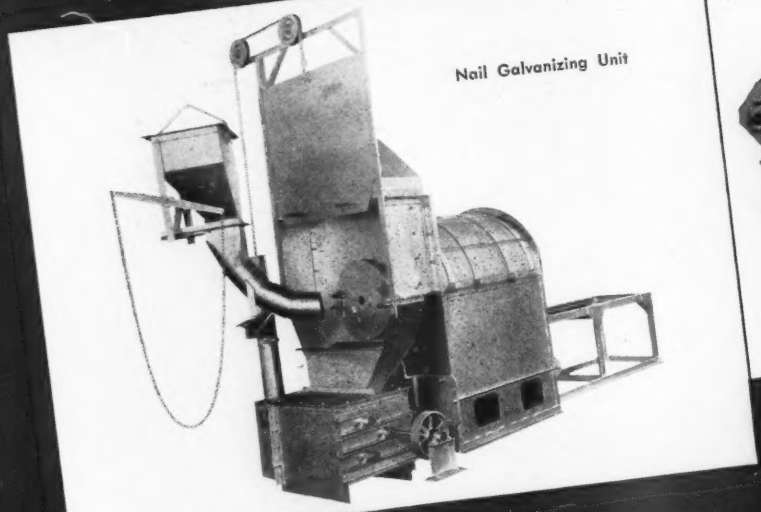
## Equipment Corporation

CLEVELAND, OHIO

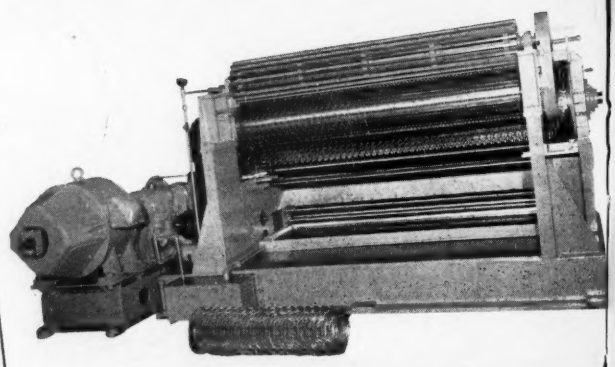


2 High Wire Flattening Mill

Wire Galvanizing Take-Up Frame



Nail Galvanizing Unit

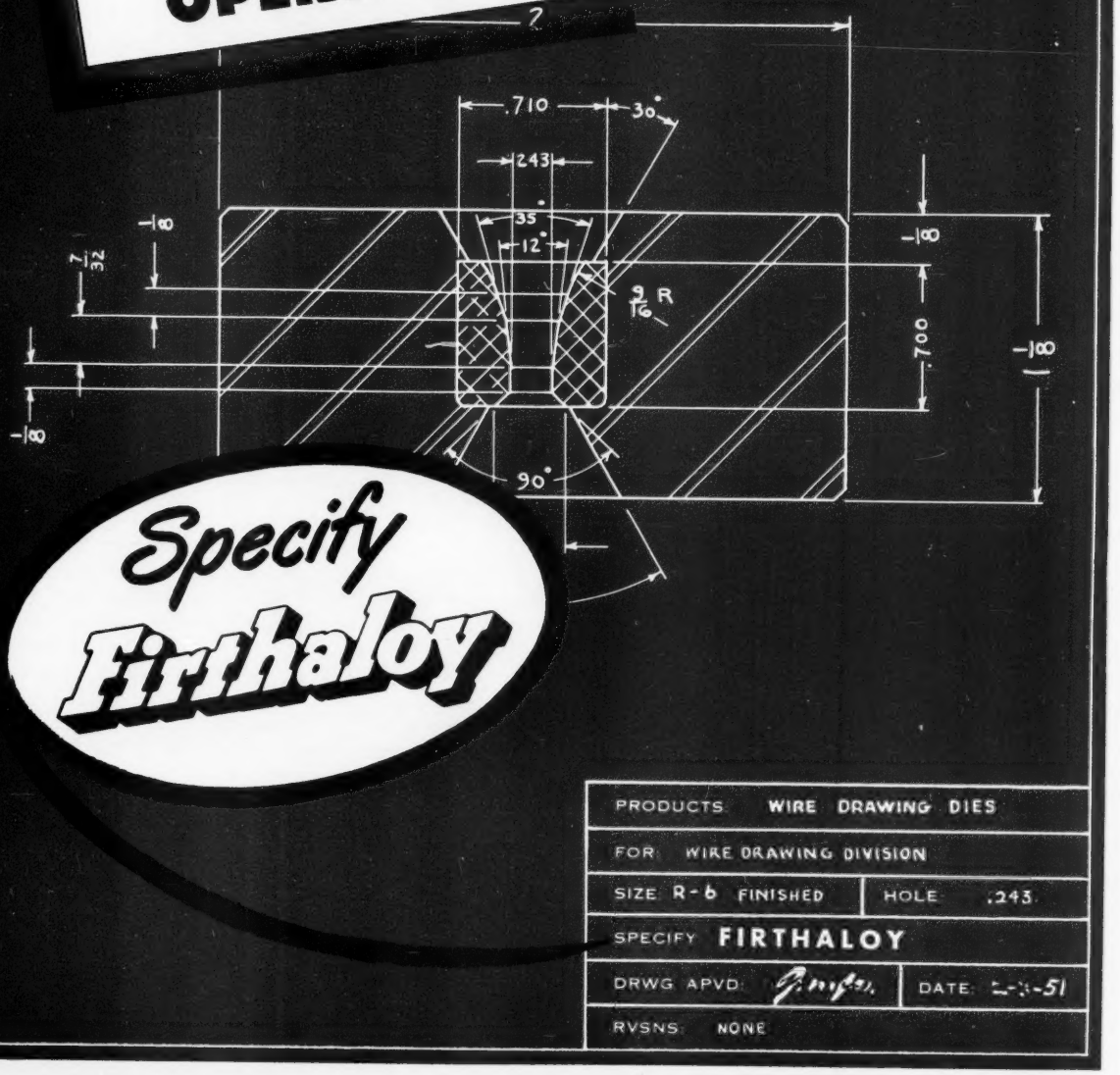


Hexagon Netting Machine

IN the past few years tremendous progress has been experienced in the field of wire machinery. Production speeds have been tripled and quadrupled. Product quality has been greatly improved. Machines have been made easier to operate and maintain.

THE Wean Equipment Corporation has been a large contributor to this advancement. Wean wire mill specialists have designed, built, and installed wire mill equipment for the leading wire producers the world over. If you make wire you should look to Wean for the best in machinery, service, and facilities.

# Memo to: ECONOMY-MINDED WIRE MILL OPERATORS




## Specify Firthaloy

| | |
|---|---|
| PRODUCTS: WIRE DRAWING DIES | |
| FOR: WIRE DRAWING DIVISION | |
| SIZE: R-6 FINISHED | HOLE: .243 |
| SPECIFY: FIRTHALOY | |
| DRWG APVD: | DATE: 2-13-51 |
| RVSNS: NONE | |

R-225

**Firth Sterling**
STEEL & CARBIDE CORPORATION

DETROIT • DAYTON • CLEVELAND • HARTFORD
NEW YORK • CHICAGO • PITTSBURGH
PHILADELPHIA • LOS ANGELES • BIRMINGHAM

# Don't Let IRON and STEEL SCRAP Gather Cobwebs!

Somewhere, back in a corner of your plant or shop, there's some scrap iron and steel. Maybe quite a pile, gathering rust. Maybe some obsolete machinery, long unused. Maybe odds and ends that total many tons. You've meant to have it hauled away, but somehow it's still around.

***Now's the time to sell it!***

Call the nearest scrap dealer; ask him to give you a price. He'll pay good money for it. Prices are high . . . the nation's steel plants need scrap badly. With a stepped-up defense program under way, scrap is more than ever a vital ingredient of steel production. Industry must help take up the slack—*fast.*

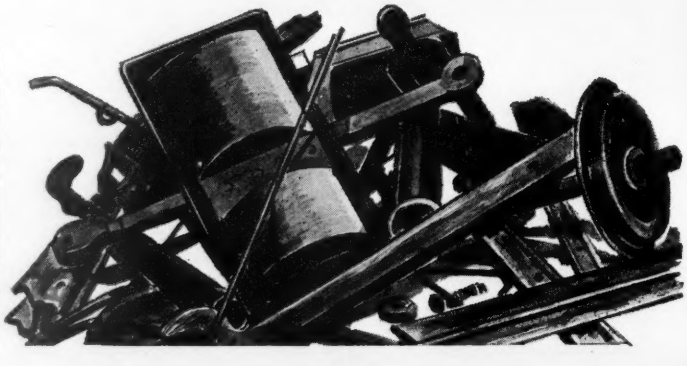
A constant flow of scrap means greater tonnages of iron and steel. It means more finished products made of iron and steel. You can help . . . and help yourself as well. Get that scrap in circulation. Get it on the job!

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

**BETHLEHEM STEEL**

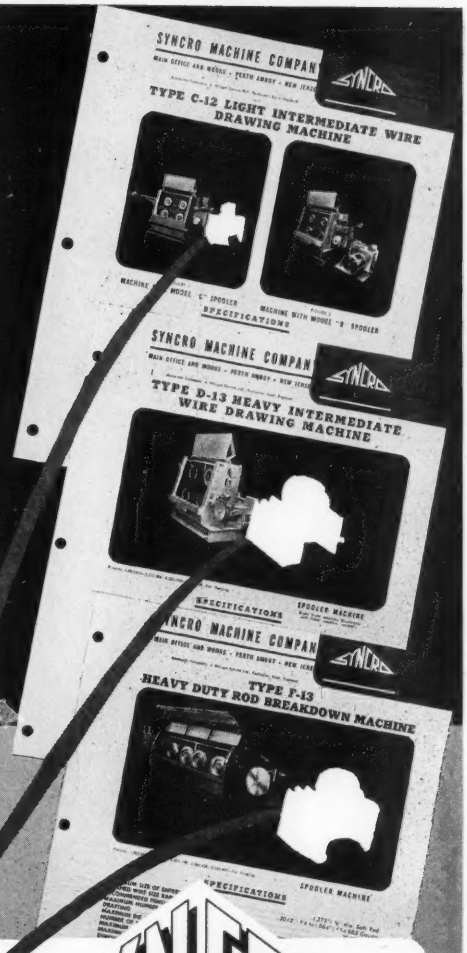
BETHLEHEM STEEL

If you don't know the name of a scrap dealer, look one up in the yellow classified pages of the telephone directory. You'll find a listing there.



# your best answer to HIGH SPEED SPOOLING

FOR HEAVY AND INTERMEDIATE NON-FERROUS WIRES



1 SOMETHING NEW

2 SOMETHING BETTER

1 TUMBLER GEARS ALLOW SIX FAST SPEED CHANGES

EXCLUSIVE with SYNCRO

2 IMPROVED PNEUMATIC BRAKING SYSTEM — QUICK-ACTING • POSITIVE • LONG-WEARING

SYNCRO

. . . with their policy of "SOMETHING NEW—SOMETHING BETTER" have developed, and proven under actual working conditions, a spooler to enable higher speeds not previously possible. Spooling is the heart of your wire drawing operations. To fulfill the need for faster spooling, to cope with faster drawing, SYNCRO now offers this unit for profitable replacement of existing spooling devices, or for new installations,—SYNCRO or otherwise. Inquiries are welcome.

*Machinery for the Wire Industry*

WIRE DRAWING MACHINES • STRANDERS • DIE STRINGERS
PAYOFFS • CABLERS • CONTINUOUS ELECTRIC ANNEALERS
CAPSTANS • WIRE INSULATORS • HEAVY DUTY TAKE-UPS
TAPERS • RE-SPOOLERS • CLOSERS • SPECIAL MACHINERY

**SYNCRO MACHINE COMPANY** • PERTH AMBOY • NEW JERSEY • USA

*Affiliated Company WINGET-SYNCRO, LTD • ROCHESTER • KENT • ENGLAND*

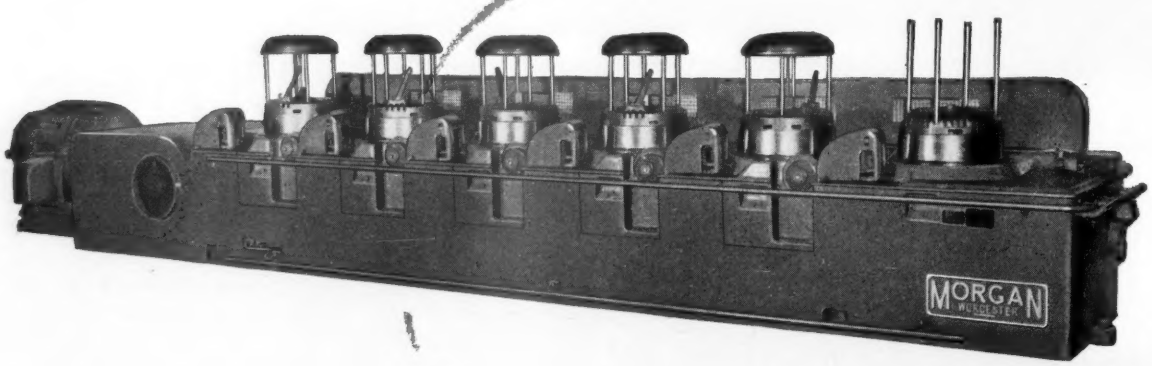
## HOW DOES YOUR WIRE MILL STAND

# ON Quality

Are high quality requirements keeping you out of "juicy" business?

Morgan-Connors are the answer to your problem.

Call in a Morgan engineer.




*Replace with*

ROLLING MILLS
MORGOIL BEARINGS
REGENERATIVE FURNACE CONTROLS
AIR EJECTORS
PRODUCER GAS MACHINES

# MORGAN-CONNOR

## WIRE MACHINES

WM53

MORGAN CONSTRUCTION COMPANY • WORCESTER, MASSACHUSETTS

# WIRE AND WIRE PRODUCTS*

Reg. U. S. Pat. Off.

A monthly publication devoted to the production of Wire, Rod and Strip, Wire and Rod Products and Insulated Wire and Cable.

DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 26 MAY, 1951 No. 5

Designated as Official Publication By The Wire Association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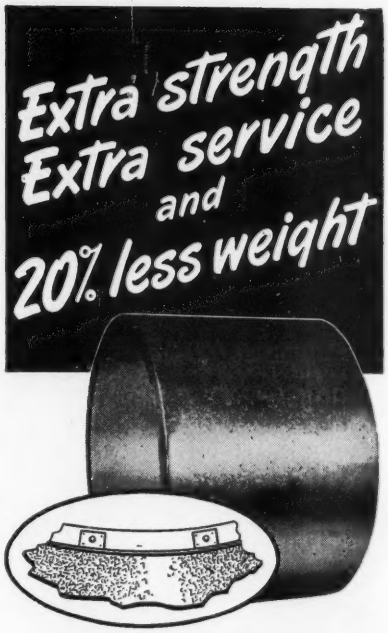


NILES

"Reinforced Type"
FLANGED STEEL TRAVERSES
for wire and cable

. . . have extra strength where it is needed most—at bolt holes and base of the flange. This reinforcing makes possible the use of lighter gauge steel, saving up to 20% in weight while increasing overall strength.

Niles Flanged Steel Traverses have given as much as sixteen years' service without refinishing or major maintenance, according to actual experience records. In many cases their use has doubled the number of trips per reel before cut downs or scrapping of wooden heads.

They are manufactured in sizes up to 56" diameter and 48" traverse —in plain, painted or hot dip galvanized finishes—as light as 18-gauge steel. Width of flange and number of bolt and drain holes are furnished to your specifications. Available for prompt delivery. Write for prices.

• • •

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NILES STEEL PRODUCTS DIVISION
REPUBLIC STEEL CORPORATION
NILES • OHIO



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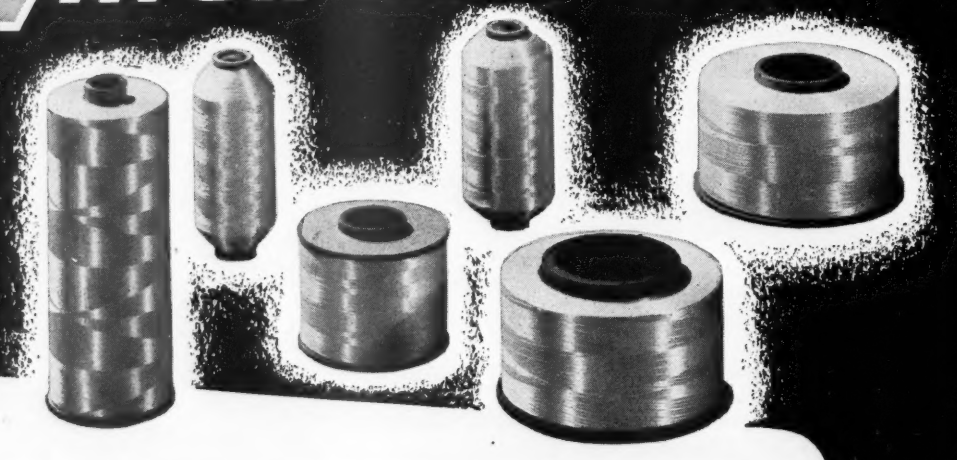
# Low-Twist Vitron GLASS YARNS



## Cut material, time and inventory costs

To meet a specific need of many manufacturers, Glass Fibers originated VITRON 300 glass yarn—a new strand size—in low-twist constructions. So rapidly are low-twist 300's becoming a standard of the industry, that Glass Fibers has also made available low-twist 450's and 225's as well, all in a complete range of constructions and packages.

In this time of increased nation-wide production for preparedness, extra fiber supply is important. Low-twist yarns can be turned out by the manufacturers of basic glass fibers at a faster rate, thus making more insulating material available to the electrical industry.

*This product improvement and cost saving can easily be applied to your magnet wire production. Write for information and engineering consultation.*

**In wire insulating plants where VITRON low-twist yarns are in use, manufacturers find these money-saving advantages.**

**Cuts Material Cost**—as much as 20% to 40% over previously used yarns.

**Saves Time**—because low-twist yarns can be applied faster, and build-up can be adjusted by varying pull-out or flyer speeds to bunch or spread the same yarn.

**Reduces Inventory**—since low-twist packages can be used for a wider range of jobs, fewer types are needed, reducing yarn inventories by as much as one-third.

Vitron® GLASS FIBER

**ELECTRICAL INSULATING MATERIALS**

**GLASS FIBERS INC.**
1810 Madison Avenue, Toledo 2, Ohio

for ease of operation...
economical production

use **Pittsburgh**
**COLD HEADING WIRE**

The Steel Industry Needs Scrap— Keep it Moving

You get trouble-free service from your cold heading machines —more economical production with Pittsburgh Wire. It feeds smoothly into your dies because of its uniform size. It forms readily in upsetting, extruding, thread rolling, bending and flattening operations because it has the ductility and the correct lubricant you need for high quality production in your particular operation.

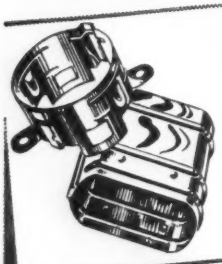
The precision control of quality at Pittsburgh Steel gives you sound wire, with the toughness you want in your finished product. The economy of Pittsburgh Wire will be reflected in both your production records and the quality of the items you produce. Specify Pittsburgh Steel Wire for all your cold heading and cold forming operations. For information write Pittsburgh Steel Company, Dept. W, Grant Bldg., Pittsburgh 30, Pa.

**Pittsburgh Wire**

A product of **PITTSBURGH STEEL COMPANY**

# WIRE AND STRIP PARTS
## of almost unlimited form

## can be produced faster and for less



### STRIP PARTS

A wide variety of forms can be produced direct from coiled stock at speeds up to 9,000 parts an hour. Each component is completed in a single passage through the machine, and may save six or seven separate press operations.

### WIRE PARTS

An almost unlimited range of wire forms can be produced at speeds up to 9,000 parts an hour. By means of change-parts these machines can be quickly converted from wire to strip forming or vice versa.

### PAPER CLIPS

Clips of various shapes and sizes are produced at 180 a minute from coiled stock. It's only a matter of minutes to change the actual tools to produce clips of another shape, or change the complete assembly for a different size.

### CHAIN

Knotted chain is produced at speeds up to 70 links a minute ; mattress chain at an average rate of 120 links a minute ; short link welded chain for ships, cranes, etc., is formed at speeds up to 110 links a minute, and automatically welded at rates up to 60 links a minute (according to size).

### FENCE STAPLES

Staples are produced from coiled stock at 250 a minute in the smaller sizes and 125 a minute in the larger range. Points are pressed into shape ensuring better driving qualities than are commonly found with sliced cut-off points.

### NAILS

Up to 700 nails a minute (according to size) can be produced on Heenan automatic nail presses. Round nails, oval brads, square, fluted or twisted nails can all be produced with a wide variety of head shapes, direct from coiled stock.

## on HEENAN
### automatic WIRE AND STRIP FORMING MACHINES

Write for illustrated catalogues of the equipment in which you are interested.

*Agents in U.S.A.:*
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*Agents in Canada:*
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The Queensway, Etobicoke
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**WICKMANS *of* COVENTRY ENGLAND**

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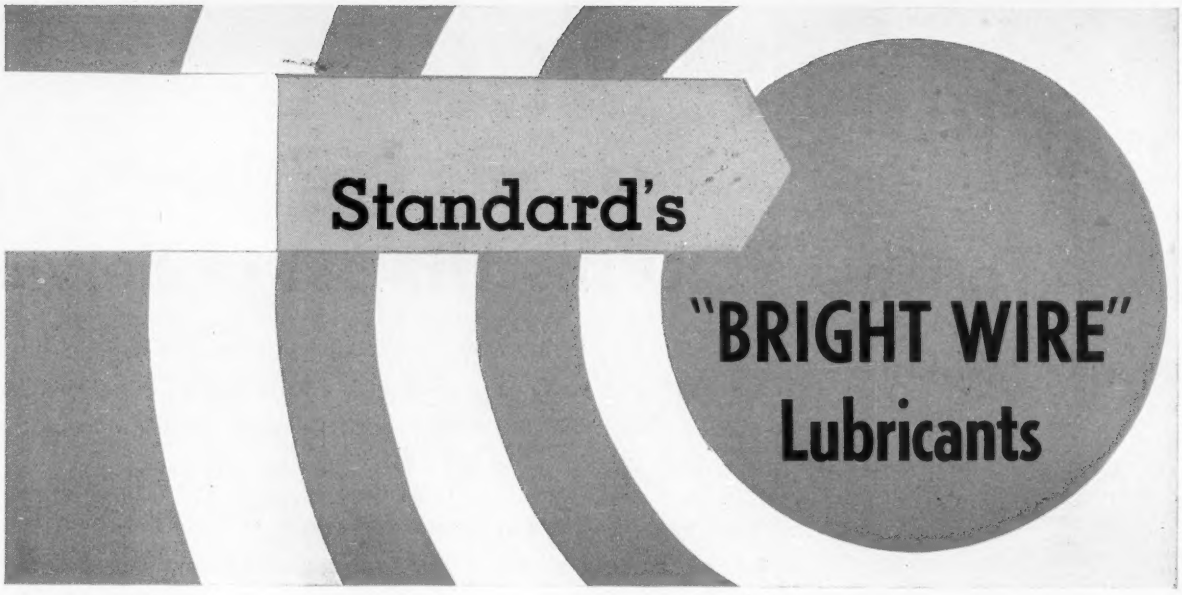


**Standard has developed bright wire lubricants for drawing low carbon wire any number of holes desired:**

1. **STANDARD WIREDRAW # 33 — for one hole, bright and clean.**
2. **STANDARD WIREDRAW #105 — for two holes, bright and clean.**
3. **STANDARD WIREDRAW #108 — for three holes, bright and clean.**
4. **STANDARD WIREDRAW #110 — for four or five holes, drawn on blocks or on continuous machines. Bright and clean finish.**

**For STAINLESS STEEL, a new soap has been developed that merits your consideration. It is STANDARD WIREDRAW #63. If you draw stainless wire, you will be interested. Reports coming in on #63 include such comments as:**

***"Best we have tried."***

***"Have been able with #63 to increase drawing speed."***

*Call or Write Headquarters or Any Standard Service Center:*

**INDUSTRIAL COMPOUNDS CO.**
*C. R. Mehl, President*
**1010 San Fernando Rd.**
**Los Angeles, California**

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*C. R. Mehl, President*
**204 Battery St.**
**San Francisco, California**

**STANDARD INDUSTRIAL COMPOUNDS CO.**
*Arthur J. O'Mara*
**Millsbury, Massachusetts**

STANDARD INDUSTRIAL COMPOUNDS COMPANY has pioneered most of the outstanding contributions to better wire drawing through better lubricants. Consult with any STANDARD representative for courteous, competent service.

wire drawing lubricants

Standard **INDUSTRIAL COMPOUNDS CO., INC.**

4600 WEST FERDINAND STREET
CHICAGO 44, ILLINOIS

# CARBIDE DIES

## *Made with One Object . . . . .*

## To Give YOU the Utmost of Service

In order that you many have the best in DRAWING DIES, only PREMIUM GRADE CARBIDE NIBS are used, properly encased to assure concentricity.

Supplied ***semi-finished*** at ***rough-drilled*** die prices to within .001"-.002" of the finished die sizes. This makes for great economy in your die-room by eliminating costly ripping from standard rough cored hole sizes. All you need to do is size and polish.

This innovation in carbide die manufacture is important to you—
***it saves you time and money.***

EASTERN CARBIDE CORPORATION'S COLD HEADING DIES, QUILLS and CUT-OFF KNIVES are made of the same fine materials and with the same skilled workmanship. Use them wherever possible and benefit from ***long uninterrupted runs.*** We supply a complete line of tooling for the cold-heading industry.

***Let us tell you about them.***
***Write or phone to***

## EASTERN CARBIDE CORPORATION

**Telephone: New Rochelle 2-6630**

**909 Main Street** **New Rochelle, N. Y.**

*Complete Carbide Sales and Service*

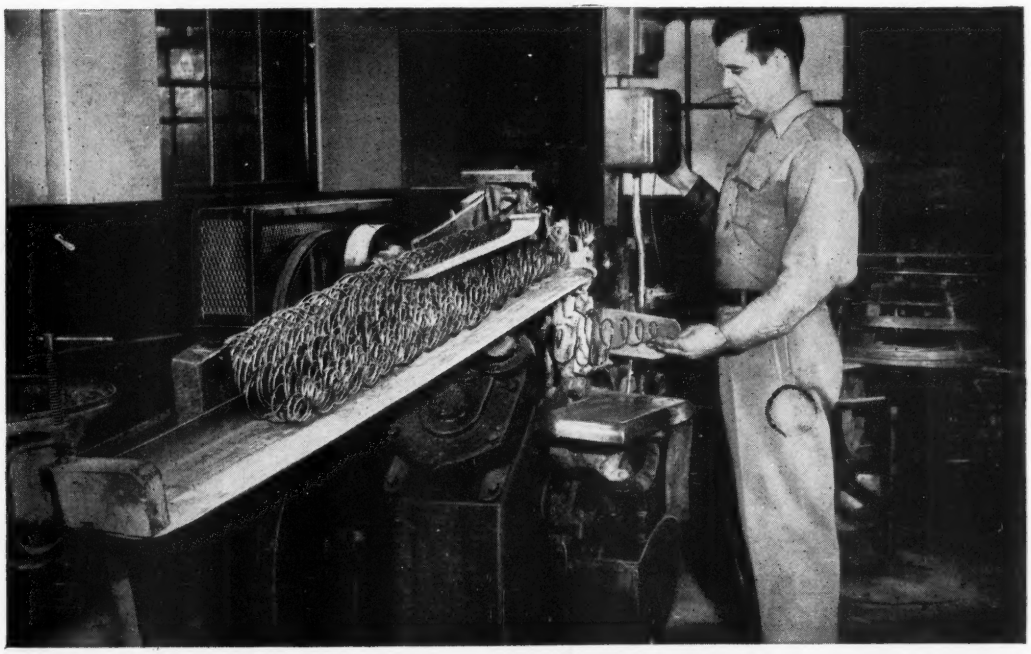
# SPRING WIRE

## *Roebling is one of America's largest manufacturers of specialty wire*

ROEBLING MAKES a full range of Spring Wires to meet almost countless purposes. There's upholsterers' spring wire. There's a wide variety of mechanical spring wires, including hard drawn, soft, annealed or oil-tempered M.B., H.B., and Extra H.B. spring wire; music wire, and valve spring wire . . . available in a large range of physical properties and finishes.

And on top of that, from open hearth to finished wire, all manufacturing processes are carried out in Roebling's own plants where positive control assures highest uniform quality at all times. From end to end, Roebling Spring Wire is identical in gauge and finish, in mechanical and metallurgical properties . . . saves preparation time for users . . . brings faster, smoother production.

Large quantities of Roebling specialty wire are required in today's rearmament program. You can count on us, however, to make every effort to meet your delivery requirements, always. John A. Roebling's Sons Company, Trenton 2, New Jersey.



# ROEBLING

***Atlanta,*** 934 Avon Ave ★ ***Boston,*** 51 Sleeper St ★ ***Chicago,*** 5525 W. Roosevelt Rd ★ ***Cincinnati,*** 3253 Fredonia Ave ★ ***Cleveland,*** 701 St. Clair Ave, N.E. ★ ***Denver,*** 4801 Jackson St ★ ***Detroit,*** 915 Fisher Building ★ ***Houston,*** 6216 Navigation Blvd ★ ***Los Angeles,*** 216 S. Alameda St ★ ***New York,*** 19 Rector St ★ ***Odessa, Texas,*** 1920 E. 2nd St ★ ***Philadelphia,*** 230 Vine St ★ ***San Francisco,*** 1740 17th St ★ ***Seattle,*** 900 1st Ave, S. ★ ***Tulsa,*** 321 N. Cheyenne St ★ Export Sales Office, ***Trenton, N. J.***

# When We Sell Wire WE GIVE SERVICE

There's more than quality steel in Continental wire—there's service . . . the kind of helpful service that frequently results in the saving of both time and money for our customers. Continental takes a personal interest in every customer. We make it a point to provide exactly the right grade or temper of wire for a specific need. Our many years of experience in producing wire for more than a thousand uses often enables us to provide wire users with practical and beneficial advice that helps them build better products. Our location and size permit this close, family relationship and make us a select wire source for our customers.

## Special Wire Shapes For Special Applications

Many of our customers find that shaped wire helps them trim costs and add sales appeal to otherwise ordinary products. Providing wire in special shapes is another Continental service for its customers.

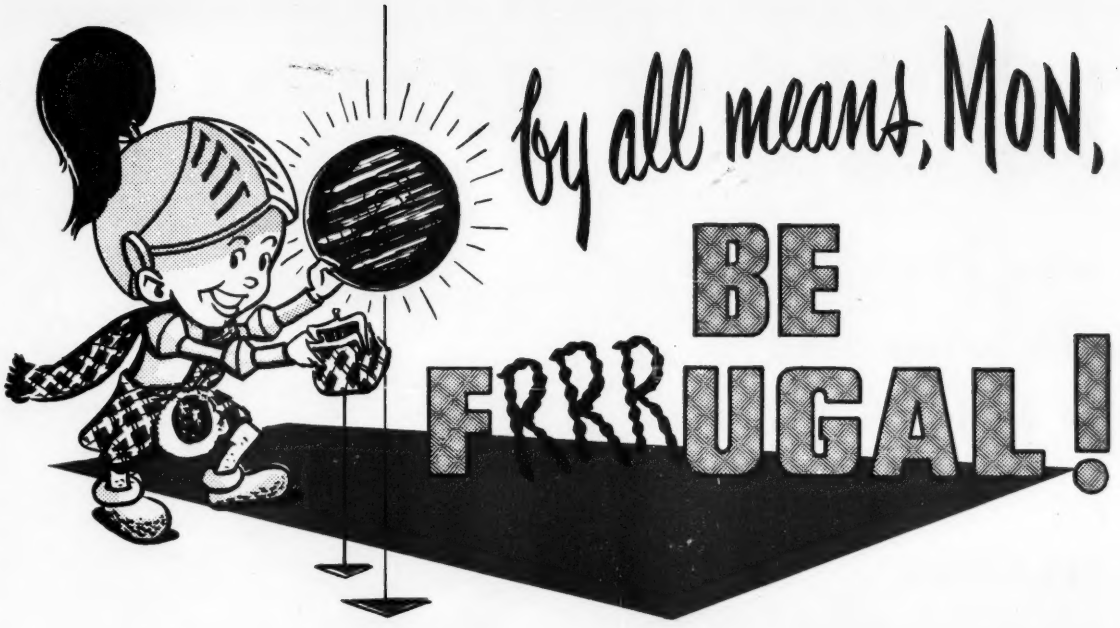
*Trade Marks Reg. U.S. Pat. Off.

CONTINENTAL STEEL

# CONTINENTAL STEEL CORPORATION

GENERAL OFFICES • KOKOMO, INDIANA

PRODUCERS OF *Manufacturer's Wire* in many sizes, shapes, tempers and finishes, including Galvanized, KOKOTE, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright, Lead Coated, and special wire. ALSO, Coated and Uncoated Steel Sheets, Nails, Continental Chain Link Fence, and other products.




Are you saving pennies by the pound of coating material . . . and throwing dollars down the drain?

This is actually happening in many, many wire mills today, simply because so many of the new coatings, which CLAIM to be the same as Metalcoat #267, just can't live up to that claim.

It stands to reason that, when you have to dump your coating tank on an average of every four weeks, you are using an awful lot of coating material during the course of a year. On the other hand, the average life of a tank of Metalcoat #267 solution is about four months. In simple arithmetic, no matter how cheap PER POUND your present coating may be, #267 is much cheaper in terms of longer life, and, more important —TONS OF ROD OR WIRE COATED THROUGH THE SAME SOLUTION.

Metalcoat #267 is the ORIGINAL, time-tested borate lime replacement.

With #267 there is NO RUST
NO BAKING
NO SULL COATING

*Patent Pending

A Magnus Standardized Product

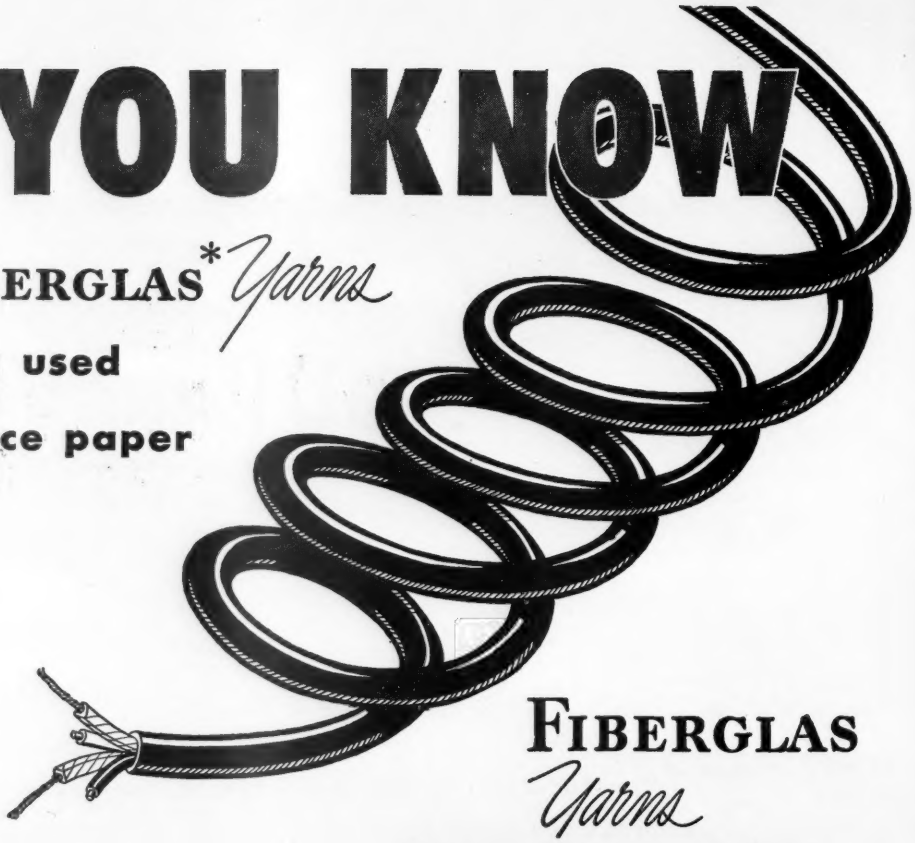
*Metal Coating Division . . .*

**MAGNUS CHEMICAL CO., INC.**

SOUTH AVENUE • GARWOOD, N. J.

# DO YOU KNOW

why FIBERGLAS* *Yarns* are being used to reinforce paper filler in FLEXIBLE CORDS?



FIBERGLAS *Yarns*
REINFORCED PAPERS

Along with the entire electrical industry, Owens-Corning Fiberglas Corporation is faced with increasing civilian and military demands. While we cannot now supply all the materials our customers want, we are substantially increasing our production facilities. Therefore, we believe it to your future best interests to consider this new and recommended use of Fiberglas yarns.

- HAVE GREAT TENSILE STRENGTH
- HAVE GOOD CONFORMANCE
- ARE EXTREMELY FLEXIBLE
- AND ARE LOW IN COST!

*Fiberglas is the trade-mark (Reg. U. S. Pat. Off.) of Owens-Corning Fiberglas Corporation for a variety of products made of or with glass fibers.

For complete information about Fiberglas for this and other uses, write Owens-Corning Fiberglas Corporation, Electrical Sales Division, 16 East 56th Street, New York 22, N. Y.

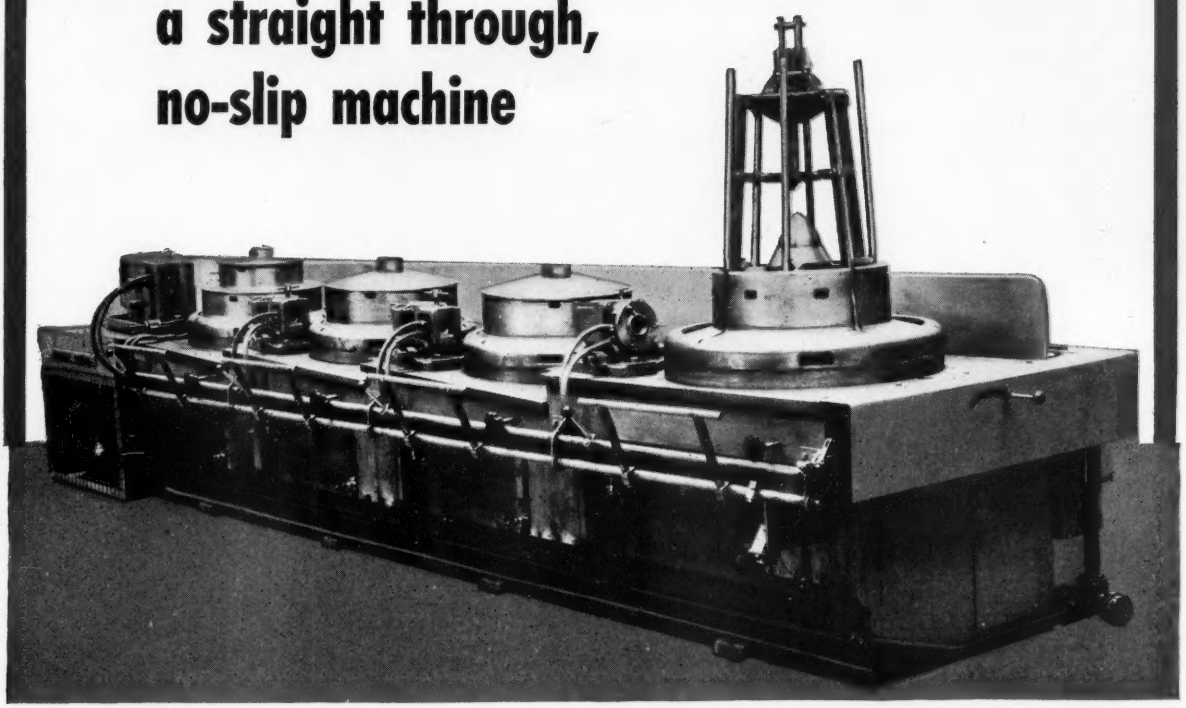
OWENS-CORNING FIBERGLAS *Yarns*

FIBERGLAS IS IN YOUR LIFE...FOR GOOD!

## For completely new efficiency...

# PATHFINDER

## a straight through, no-slip machine



LOOK AT THESE FEATURES of the advanced-design Marshall Richards Pathfinder:

★ Wire passes straight through the machine from block to block. Block speeds automatically regulated by patented electrical gear.

★ Tilted blocks. Enough wire is accumulated on each block to permit ample cooling and yet pass through die to bottom of following block in a straight line.

★ Practically infinite drafting is obtainable at each die.

★ Pathfinder is ideal for use with a heavy spooler carrying up to two tons of finished wire.

★ No guide pulleys! Multi-Holing from very heavy inlets is readily practicable.

★ Drawing speeds to 3000 feet per minute are available.

Write for full information about the Pathfinder or the full line of Marshall Richards equipment for drawing wire in all metals from .0004" to 1 inch.

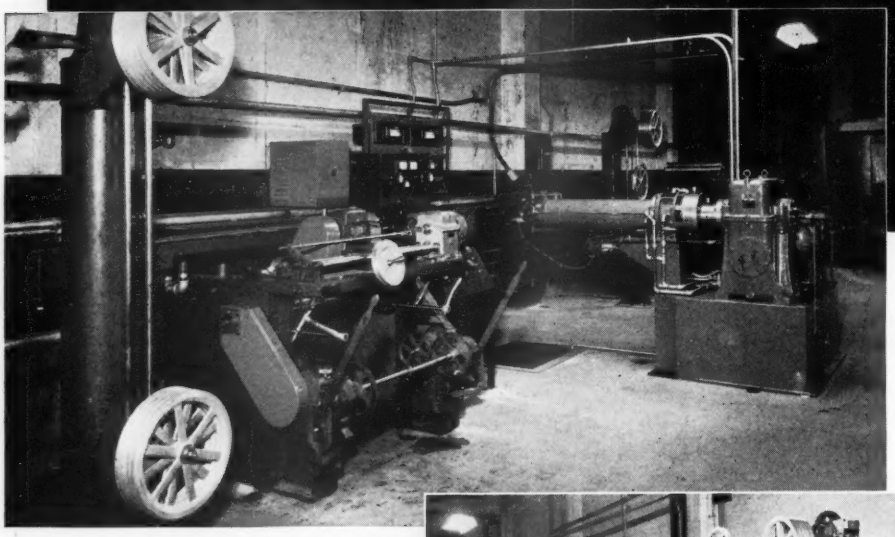
MARSHALL RICHARDS MACHINE COMPANY, INC.

1100 BROAD STREET, TRENTON 10, NEW JERSEY
Telephone, Trenton 9478 Telegrams, Marich-Trenton

MARSHALL RICHARDS

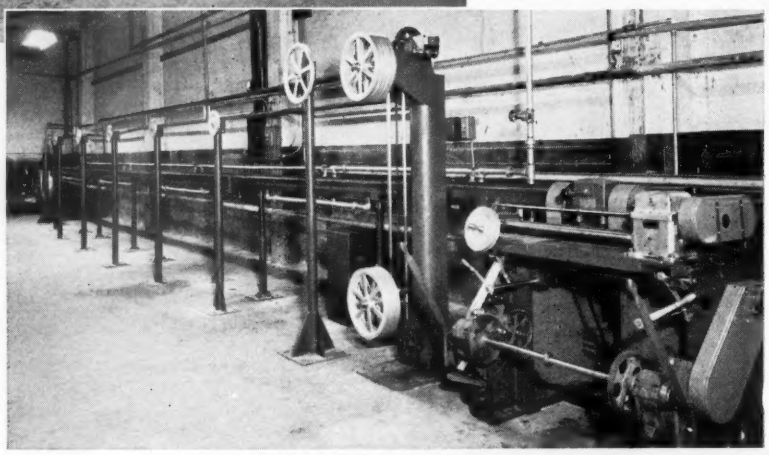
D R A W O N O U R E X P E R I E N C E

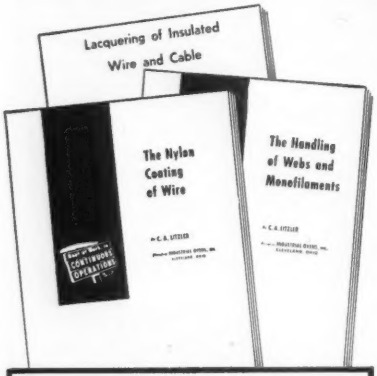
# *Complete Continuous System for* Plastic Jacketing of Wire and Cable



A view from the takeup end of a complete extrusion line with nylon head tuber. Driven letch stand and tension stand shown in the background.

A view of the same extrusion system showing capstan, cooling trough, tension control stand and continuous takeup machine.



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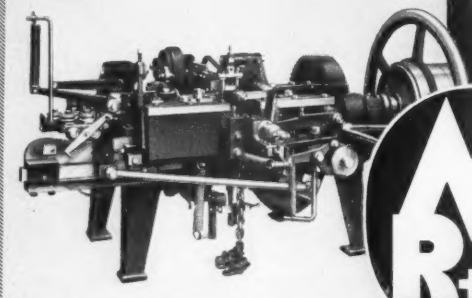

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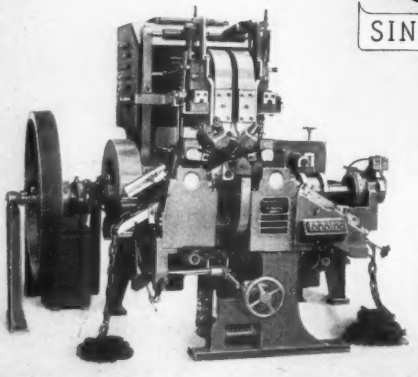

## Production Program for 1951

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Chain bending and chain welding machines for wire diameters of 2—26 mm.

Bending and welding machines for crane and extra-heavy chains with a wire diameter up to 36 mm.

Chains twisting machines. Machines for manufacturing knotted chains.

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Machines for making chain fittings.

Welding machines for single chain links, rings, buckles, etc.

### *Wire and sheet metal working machines for the production of:*

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Grinding machines for wire nail cutters.

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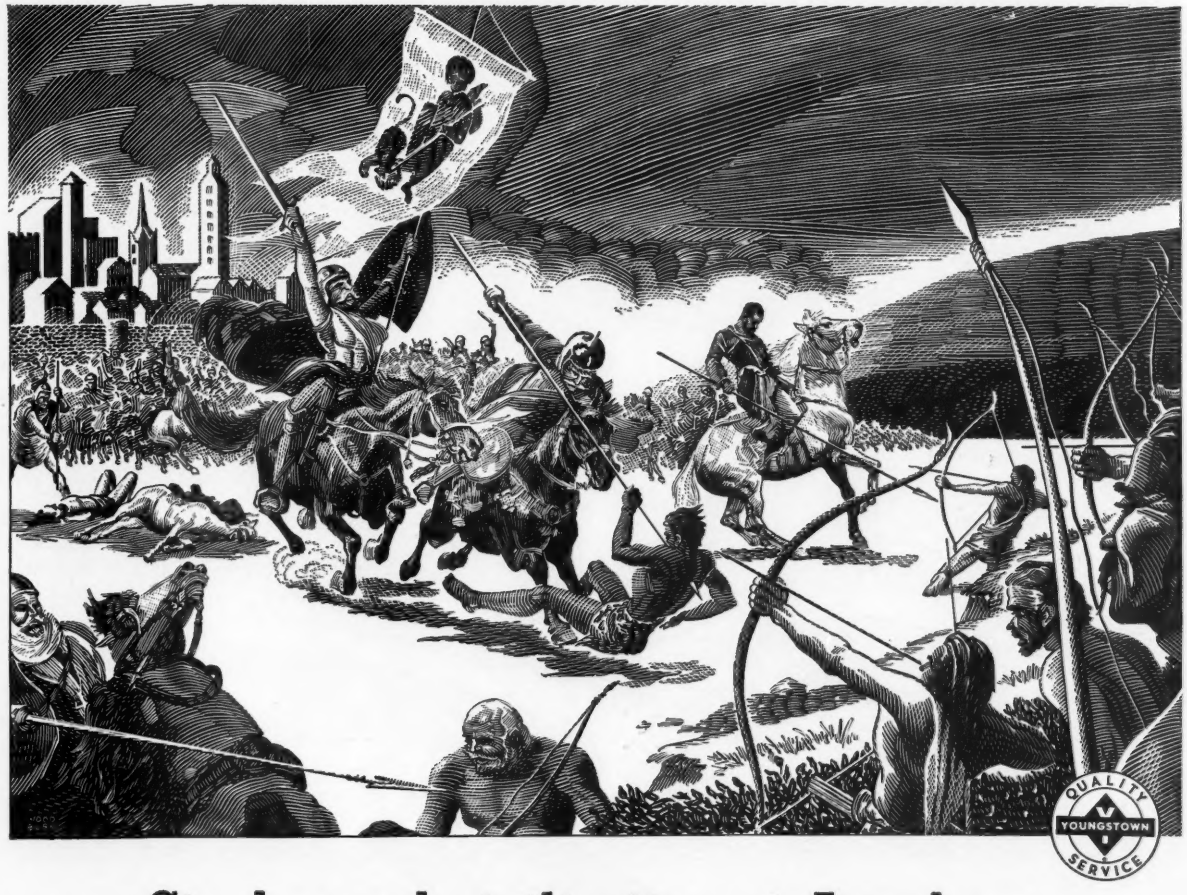


# Steel saved civilization at Augsburg

FOR 2000 years, the western world has survived vast waves of Asiatic invaders who threatened to destroy it. Repeatedly, the fate of civilization and Christianity has seemed to hang on the outcome of a single battle.

Such a decisive action was fought at Augsburg, South Germany, in 955 A.D. Swarming out of Asia, savage Magyars overran the rich Danube Valley. They ravaged the prosperous lands of Germany, Italy and France. At last, under Otto, King of Saxony, the armored Knights of Christendom rallied. They faced a hundred thousand fierce foes. The battle raged all day. Thousands were slain. At last the tide turned and the Magyars fled. For three days the Knights pursued the scattered enemy, killing or capturing thousands more. Symbolic of the west's predominance in weapons and armor of iron and steel, victory was credited to King Otto's iron-tipped Holy Lance.

Augsburg ended the Magyars' attempts to conquer Europe. They settled down to peaceful living in their valley and within 50 years accepted Christianity. Again, history demonstrated the truism that no people or alliance can establish supremacy unless it first predominates in the production and use of iron and steel.

It is reassuring that America produces twice as much steel as the rest of the world combined. America has the steel to win. We will use enough of it to protect our leadership of a free Christian world.

Scrap Metal is Critical Again

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The steel industry is using all its resources to produce more steel, but it needs your help and needs it now. Turn in your scrap, through your regular sources, at the earliest possible moment.

# FIGURE IT YOURSELF

**TIN SAVINGS* in Pounds During One Shift Operation of a 20-wire Unit at Typical Plating Speeds**

| Wire Size B & S Gauge No. | 500 FPM | 700 FPM | 900 FPM |
|---|---|---|---|
| 40 | 8.5 | 11.9 | 15.3 |
| 30 | 27.0 | 37.8 | 48.6 |
| 20 | 85.6 | 119.7 | 153.9 |

* Based on the 60-millionths thickness difference between 20-millionths inches, required for ASTM test, and 80-millionths, usual hot dip thickness. Operating shift period is 7½ hours.

## HERE'S THE TIN YOU WOULD SAVE BY PRECISION WIRE COATING with DU PONT HALOGEN TIN PLATING PROCESS

THE table shows the tin savings you can make during *only one shift.* Think of the savings in metal and dollars that are possible over the period of a week . . . or a month . . . or a year!

Because the Du Pont Halogen Tin Process permits precision control of the coating thickness, 20-millionths inches of tin (more than enough to pass the ASTM test) can be applied more easily and uniformily than the 80-millionths usually put on by the hot dip process.

Using equipment that is simple, easy to install and operate, the Du Pont Halogen Tin Process produces a superior wire coating at higher speeds and at lower cost. It is the same process which has proved so successful in steel plants for electrotinning strip.

Let us tell you more about this process . . . how it can speed up your production . . . conserve critical tin . . . save precious man-hours. Just call or write to the nearest office of E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Department, Wilmington, Delaware. District Sales Offices are located in: Baltimore, Boston, Charlotte, Chicago, Cincinnati, Detroit, El Monte (Calif.), New York, Philadelphia, Pittsburgh, San Francisco.

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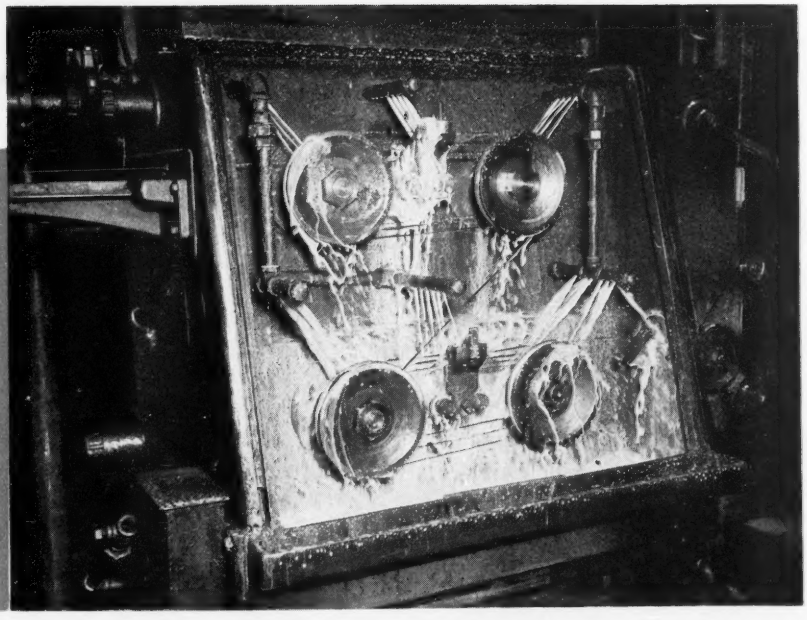

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**Tested for 20 weeks**

**5 days a week**

**2 shifts per day**

Illustration shows actual operation in mill.

*Results Obtained:*

1—Machine very clean at all times
2—Rejects negligible
3—Down time negligible
4—Die life excellent

**Wire sizes:** Inter-mediate sized copper wire entering at 12 gauge finishing at 33 gauge

**Speed:** Entering sizes at 3,000 ft. per min. Finishing sizes at 5,000 ft. per min.

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| | | KANSAS CITY Baltimore 1700 | NEW YORK Flushing 3-0027 | ST. LOUIS Newsted 3110 | |

# The Wire Outlook

One of the dominant characteristics of the American mind is the desire ever to be doing things in a bigger and better way. While this has resulted in great progress, a lot of good folk are inclined to feel that we are going to pot if the trend is checked for any reason.

Perhaps, though, conditions are not as bad as they seem. We are hearing a lot about cut-backs, worker shortages, lack of materials and so on, yet, barring an all-out war, the country will be erecting as many buildings, manufacturing as many appliances and making as many cars in 1951 as we did in 1949—a good year. It would be nice to exceed 1950's gratifying records, and we probably shall in future years, but the fact remains that 1951 will see a comfortable volume of civilian goods made and bought, many of which are going to require considerable quantities of wire. Defense production? That is something that will be added to our regular production schedules and that also will consume a big slice of the wire output.

In very few lines have real shortages developed. There is some talk to the effect that no cuts will be made in civilian production this year. Our guess is that if cut-backs are not officially required, they will come about by force of circumstances from availability for civilian products.

On the Washington front, matters are not too happy. Drifting and lack of real leadership has caused Congress to distrust the Administration and its aides; the Administration is critical of the Congress; top military leaders are distrustful of our diplomats and vice versa; labor leaders have no confidence in the government; and management doubts the motives of the labor moguls. Most of this comes back to the White House, which has been unable to furnish a national objective and coordinate the nation's diverse interests. The result is a political vacuum in which the Administration is definitely on the defensive.

Labor's walk-out on the Government proved successful—from its point of view. After winning concessions they walked in again. The result is another general march toward higher wages. In May and June, labor leaders are expected to begin to apply pressure for tighter laws governing price controls, with some food and other prices relating to basic living costs rolled back. More strikes against the Government are likely in the summer.

One of the major developments in 1950 was the contraction of our export sales and the increase in our imports. This produced an unbalance of trade approximately $1.5 billions —the first time in many years. The Korean war, of course, has been directly responsible for our increased purchases abroad.

Wire remains hard to get. Some few wiremakers have ceased booking civilian orders because of their D.O. order loads. Non-integrated mills are putting great pressure on the rod mills for more rods. So many have scoured European sources of supply that little more can be expected from that quarter. Military requirements for wire and wire products have increased to such an extent that the NPA has upped the percentage of carbon rods to be set aside for this purpose from 15% to 20%, on alloy wire rods from 25% to 40%, on nails and barbed wire from 5% to 10% and on stainless steel wire from 25% to 50%.

The mild Spring and a desire to be forehanded has greatly accentuated the demand for wire for farm products—fencing, bale ties, etc. Bolt and nut orders are piling up, with deliveries lengthening so much that some users are machining their own as a stop-gap measure.

Too much wire is moving through gray market channels for comfort. Some coming into this country from abroad is commanding premiums. While the latter probably can't be controlled except through buyers' refusal to pay exhorbitant prices, the domestic gray market could be stamped out if genuine efforts were made to do it.

The advocates of controls in the Government are having a field day. War necessitates controls because the normal operation of supply and demand is upset too suddenly for adjustments to be made smoothly and painlessly. Some fine day we may be able to see Old Man Economic Law at work once more. That will be a good day.

—from the Editor's Desk

# WIRE SPARKERS

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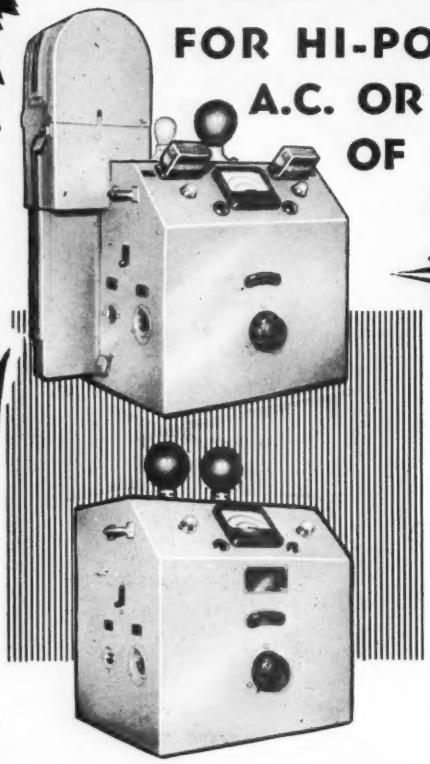

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Other D.C. units will be available with ranges up to 80,000 and 160,000 Volts. All D.C. units can be used for dielectric water testing of cable and for testing metal sheathed cable.

(See page 415 for a complete listing of JLE products for the insulated and bare wire industries)

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WIRE
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A monthly publication devoted to the production of Wire, Rod and Strip.
DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 26 MAY, 1951 No. 5

# PREDICTION and PRODUCTION of SPRINGS By STATISTICAL QUALITY CONTROL

By Ervin E. Schiesel,
Technical Director
The Mattatuck Manufacturing Company
Waterbury, Connecticut

**The importance of statistical quality control processing as described here and as practiced by the author's company, may be gathered from the fact that this company has produced over seven million springs for Government Arsenals without 100% inspection, that have fulfilled all of the government specifications.**

**The Mattatuck Manufacturing Company** has found statistical quality control techniques a powerful tool in the production of accurate load test springs for ammunition fuzes. Quality control methods in the processing cycle has led to a high yield of springs without 100% load testing. More than seven million springs have been produced for the various Ordnance Department fuzes with a total scrap loss of less than 5%.

* * *

**The basic** devices for controlled processing consist of frequency distributions and control charts for variables. These can be applied only after the characteristics of both the spring and the processing have been examined with an eye toward the practibility of control charting to eliminate piece by piece inspection. The control points are set up at the spring coiler, after heat treatment for stress relieving and after plating for corrosion protection.

* * *

## Checking the Specifications

**The first** and most important step in the setting of any controlled process is the examination of the final specifications set by the consumer. The tolerances in these final specifications are the statistical total of all of the process tolerances in the manufacture of springs. With the exception of recorded experience, there is no method available that can be used to forecast the possibility of producing springs to specification. An easy way of determining the practicability of making the spring to the final load test specifications is the graphical method which is outlined below. This method can be used only where there is some degree of understanding of the basic limitation of springs and their processing. It cannot be used without refinement for the selection or design of springs. It may be used to check the final design for reproducibility in commercial manufacture without expensive 100% inspection.

* * *

**Given** the following load at length specifications for a straight open compression spring:

7 oz. ±.5 oz. at .140″
4.5 oz. ±.5 oz. at .290″

A load versus length plot is made on cross-section paper by connecting the mean values of the load and extending the line until it intersects the zero load line. This is the theoretical free length of the spring. This intersection is then used as a starting point for determining the envolope of the tolerances by drawing a line from this point to the load limits of the maximum compressed height. At the .290″ length, the load tolerance has been reduced about 40%, so that the true final load specifications at this length are only ±.3 ounces. From previous experience, it has been determined that this load tolerance can be held from the coiler, but that it may not be held after all the processing has been completed. In cases where specific recorded experience is not available, a coiler would be set up to determine the machine capability and spring reproducibility by means of frequency distributions and control charts for variables.

* * *

**From** past recorded experience, it has been found that the relationship between coiler capability and final load specifications must be carefully examined in order to determine the in-process specifications. Where the spread between the coiler and final loads is too small, difficulty will be encountered in reproducibility and yield. The first in-process specification that must be set is the coiler load test tolerances, which is based on the machine capability. In this particular case, the machine capability is approximately equal to the final government specifications. It is apparent that this can mean only one hundred percent inspection to assure compliance with specifica-

tions. This relationship was shown to the technical and engineering staff at the Arsenal concerned, and it was agreed that the revised specifications would be in line with the natural limits of the spring producing process as long as the functional characteristics were met in the fuze. The new final specifications were set, not by engineers, inspectors, or production personnel, but rather by the spring coilers and heat treating cycle. The new limits were set at:

6.5 oz. ±1 oz. at .140″

4.25 oz. ±.75 oz. at .290″

and are shown in the illustration in dot – dash lines. See Fig. 1. These load tolerances increase as the compression increases, which is a more logical and realistic set of load tolerances than those presented in the original specifications.

★ ★ ★

## Setting the In-Process Specifications

**The actual** setting of the in-process specifications is a case of applying specific and intimate knowledge of the particular spring, rather than off-hand, rule of thumb, or theoretical treatment. The first approximation for coiler specifications is based on the load length curve and the coiler capability. The heat treatment for stress relieving specifications are, as yet, based on cut and try methods, though it is hoped that enough data can be amassed, so that accurate prediction can be made. The increase in load due to plating can actually be calculated by taking into account the increase in diameter due to plating. However, it is easier and more accurate to process a lot through plating, so that actual experience can be applied. In short, there is no substitute for recorded and substantiated experience. The in-process specifications on the load at .140 were set as follows:

| | |
|---|---|
| Coiler | 5.6–6.4 |
| After Heat Treat | 5.8–7.0 |

★ ★ ★

## Load Testing

**In order** to use successfully the control chart method for variables, the tolerance spread must be measurable in approximately ten steps. If the total running tolerance is one ounce, then the process must be checked to tenths of an ounce. Because of the small load tolerance that is allowable in springs of this kind, the testing of the springs in production plays an important role in the control of the coiler and subsequent processing. The tester must be easily calibrated and worked at the production level, and must be read directly and effortlessly by machine operators and inspectors alike. Because no standard tester was available, one was designed and built in the plant from standard micrometer barrels and a sensitive, even-balance scale. Both the length and loads can be read directly; the length on the micrometer barrel and the load on the beam of the scale in eighths of an ounce. Since the original model, newer spring load testers have been built in the plant that read variation directly down to one-hundredth of an ounce. The presence of the tester in the spring production department has led to a better understanding of machine and process capability, and an awareness of the aid that can be rendered by statistical quality control.

★ ★ ★

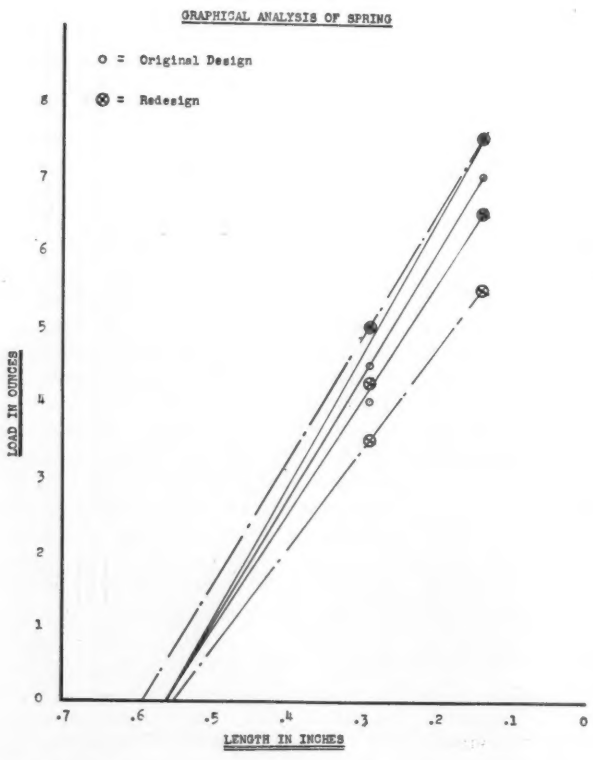


Figure I

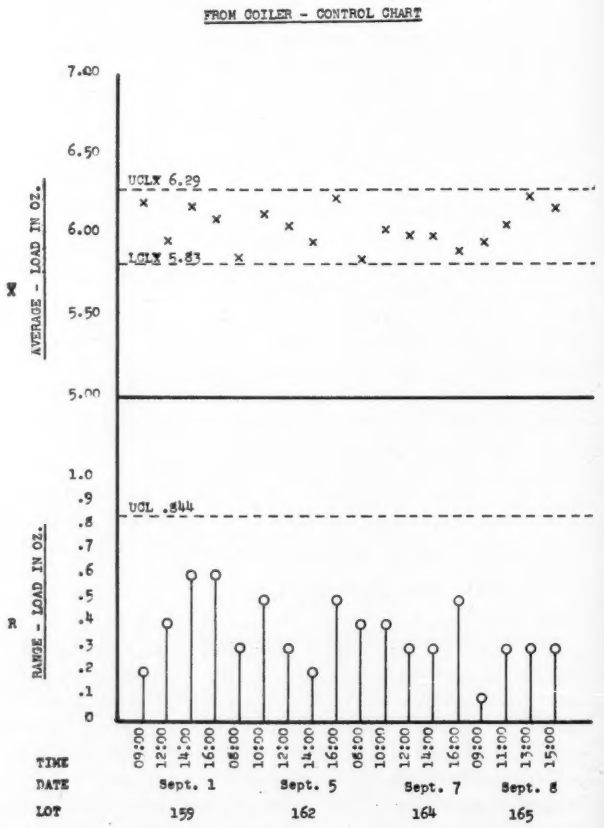


Figure II

## Charting the Coiler:

**The heart** of the entire process is the spring coiler and the accurate control of its production. The only way that this is accomplished with any degree of confidence is by means of the control chart for variables, which is the first step in building up what has thus far been referred to as "recorded experience." See Fig. 2. There are two important parts in the use of a control chart in the production area:

1. The honest and accurate recording of data by the inspector.
2. The proper interpretation of the chart by the operator.

★ ★ ★

**The** first run of the machine is recorded almost continuously in order that the data for control limits may be had in the shortest time possible. This also serves to insure that the machine is set to produce parts on the mean. In this case, the important variable to be controlled is the load, and the chart is based on recording the data on the load at the .140 length. In actual practice, both the loads were originally control-charted, but the other was dropped as soon as it was determined it was not necessary to obtain good results. The data is separated in groups of fives and the numerical average of these groups is recorded and plotted as "$\overline{X}$" (average.) The greatest numerical difference between the high and low of this group of five is also recorded and plotted as "R" (range.) The only calculations necessary are the addition of five readings, the division of the total by five, and the subtraction of the lowest reading from the highest. In formula form they are:

$$\overline{X} = \frac{X_1 + X_2 + X_3 + X_4 + X_5}{5}$$

$$R = X \text{ max.} - X \text{ min.}$$

★ ★ ★

**After** ten groups of continuous reading are recorded, the control limits can be calculated from this data. This is easily done by using factors established by Dr. Shewhart of the Bell Laboratories. These factors can be found in any text on quality control, or specifically "American War Standard" Z1.3–1942, "Control Chart Method of Controlling Quality During Production," American Standards Association.

★ ★ ★

**The grand** average is the average of all of the averages of the groups of five. This is the mean value at which the process is producing parts.

$$\overline{\overline{X}} = \frac{\overline{X}_1 + \overline{X}_2 + \overline{X}_3 + \ldots + \overline{X}_n}{n}$$

The average range is the average range of all the individual ranges of the groups of five.

$$\overline{R} = \frac{R_1 + R_2 + R_3 + \ldots R_n}{n}$$

The control limits are calculated by using of the factors for sub-groups of five in the coiler chart and for sub-groups of ten in the heat treat chart.

$$CL\overline{X} = \overline{\overline{X}} \pm A_2\overline{R} \quad CLR = \frac{D_4\overline{R}}{D_3\overline{R}}$$

**These** control limits are now put in the chart in solid lines and the tolerance lines erased. From this point on, all readings are recorded as average and ranges shown on figure 2. As long as they remain within the control limits, the process is in a state of statistical control.

★ ★ ★

## Heat Treating

**All lots** whose average and range

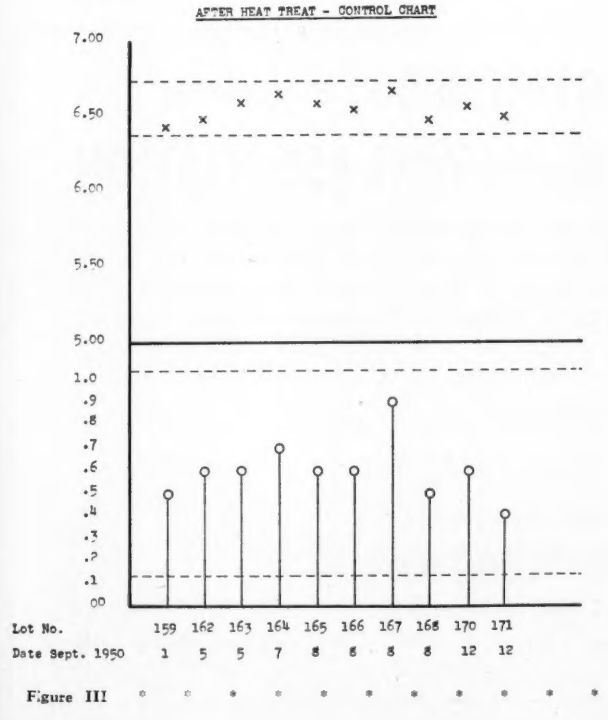


Figure III

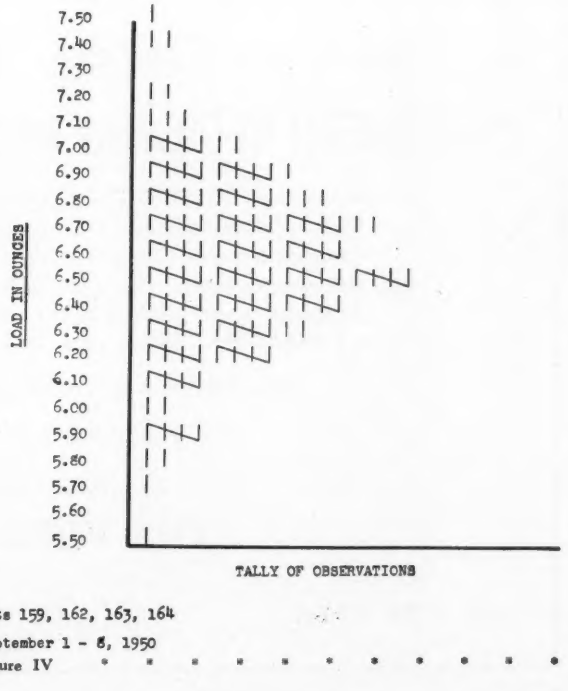


Figure IV

are within the control limits are forwarded to heat treatment for stress relieving. Both the temperature and furnace number is noted on the lot ticket in the box. The springs are sent back for a check of the load shift caused by heat treatment. This time only ten samples are taken from the entire lot, and the average and range are noted on an "After Heat Treat" control chart. See Fig. 3. Any lots at this stage of processing whose average and range are out of control are put aside for special handling. The control chart at this stage is more a check on the processing than on the nature of the spring variation. The spread between the upper and lower limits of the lot are increased because the load tolerance at this stage is a statistical total of the coiler tolerance, plus the heat treating tolerance.

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### Plating Control

**Prior** to being forwarded to plating for corrosion protection, the in-control lots must be combined in order to provide optimum barrel plating loads. The size of the loads is important from both a cost and control point of view. The size of the lot provides a constant load for plating, which helps to maintain control of the plating in the combined lot. This is the last step in the processing that affects the load relationship, and the combined lots are checked by means of a frequency distribution, instead of a control chart. This is done primarily because of the loss of identity of individual lots, but also because the distribution gives an intimate view of the lot quality, as compared to the consumer specification. See Fig. 4. This type of record which was introduced by the Hunter Spring Company as a "Quality Report" should serve industry and the Armed Forces alike as a means to reduce incoming inspection to a minimum or eliminate it entirely. This quality picture is an excellent check on the plating uniformity in the lot, as it has been found that the plating thickness varies the load test, both in average and range. If the average has shifted more or less than the standard allowed, there has been a change in the amount of plating. If the spread has increased over that of the tolerance spread, then the plating within the load is not uniform. Hence, the lot must be stripped and replated.

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### Conclusion:

**The important** aspects of controlled processing are not so much the techniques underlying statistical quality control, but the scientific approach and solution to the problems inherent in spring making. The use of measuring devices at the production level for checking loads cannot be overemphasized, as it leads to a better understanding of the manufacturing cycle. The separation of the production into distinct lots is of prime importance because of the necessity of identifying quantities for reprocessing to meet final load specifications. The use of the control chart for variables is the most important tool that has been developed to aid the operator and inspector alike in the successful execution of their respective tasks. The control chart is the first step in the substitution of "recorded experience" for rule of thumb or invalid handbook data. The frequency distribution of the load test data at the final stage of manufacture is an aid to both the manufacturer and customer, as it promotes a quality awareness, as well as a common ground for inspection and acceptance procedures. Further refinement in the statistical techniques will lead to better springs at lower cost by writing specifications which are in line with manufacturing capabilities and eliminating 100% inspection.

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*This is your* **FINAL REMINDER** *of the coming*

**SOUTHERN REGIONAL MEETING of the WIRE ASSOCIATION**

It will be a top-notch technical meeting with some special events thrown in for good measure. Don't miss it! If you haven't made your hotel reservations yet, please write or wire Richard E. Brown immediately for accommodations. There is still time if you act promptly. Full details of the program were printed in the April issue of WIRE and WIRE PRODUCTS on page 286. Please refer to it now, if you missed it.

THE DATES ARE THURSDAY AND FRIDAY, MAY 17 and 18.

THE PLACE OF MEETING: HENRY GRADY HOTEL.

*Be sure to attend this important session.*

**THE WIRE ASSOCIATION**

RICHARD E. BROWN, Executive Secretary

**300 MAIN STREET** **Tel.: Stamford 3-0482** **STAMFORD, CONN.**

# WHERE YOU'RE HIDING THE BODY!!!

ACID in a wire mill is M-U-R-D-E-R! And, wherever there's a murder, there's a body to be got rid of—in this case, your waste pickling acid.

Have you had any indignant letters lately from the civic authorities, demanding that you stop dumping your acid in the sewers—*or else*?

Have you dug so many pits you're running out of places to dig them?

How much labor, time and neutralizer do you use when you dump an acid tank—and how often do you do it?

Perhaps you had to buy tank trucks to carry your waste acid out in the country.

If these things haven't happened to you YET, it won't be long before they do.

MAGICOAT* can save you all this trouble. MAGICOAT is the new oxide coating, which lets you draw wire—WITHOUT ANY ACID CLEANING WHATSOEVER! Patented high carbon steels, annealed low carbon steels, stainless and other alloy steels may all be drawn without acid cleaning.

Process sizes drawn with MAGICOAT may be stored almost forever without rusting. Rod and wire coated with MAGICOAT have been stored for months without a trace of rust.

And, MAGICOAT is so easy to use.

*Patent Pending

A Magnus Specialized Product

*Metal Coating Division . . . .*

**MAGNUS CHEMICAL CO., INC.**

SOUTH AVENUE • GARWOOD, N. J.

# The Manufacture of Ring Travelers for the Textile Industry

By Fred Collins,
Metallurgist
Carter Traveler Co.
Gastonia, N. C.

**Among the many products made from wire are the ring travelers that are used in the manufacture of textiles. Unlike most wire products, travelers start with accurately drawn specification wire. The processing of wire into the finished travelers is a series of precision operations from start to finish. The author describes the fabricating and control steps required to assure a good product.**

**There** are several types of ring travelers manufactured, and thousands of sizes and styles in each type. Spinning travelers are made of steel, as well as grain travelers for dry twisting on horizontal rings. Most vertical twisters travelers are made of bronze, although some are steel for dry twisting. Regular spinning travelers are made of round edge flat wire having smooth round edges, also of half round wire, in a great many different circle sizes and flange openings. Some spinning travelers are made of special design with a rectangular opening through the top for improving their performance. Twister travelers are also made in a great many different shapes and sizes, depending upon the service intended.

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**The performance** of ring travelers in service depends upon their size, style, weight, and quality. They must be produced to very exacting dimensional and weight tolerances. For example, dimensions are maintained and measured to ten thousandths (0.0001) of an inch, and weights to hundredths of a grain. Style and weight are governed by the service intended. The quality, or chemical composition, physical and mechanical properties control the wear, corrosion, and corrosion fatigue resistance of the travelers.

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**Service** requirements make severe demands on the properties of ring travelers. They operate at high speeds, up to 12,500 r.p.m., with and without lubrication, on hardened steel rings testing C 62-67 Rockwell hardness. It is clear therefore, that the requirements for wear and resistance are unusually severe.

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**Suitable** alloys must be used for resistance to corrosion and corrosion fatigue, especially for wet twisters. It is well known that the endurance of metals is lowered when corrosion occurs simultaneously with fatigue. Therefore, phosphor bronze and special bronzes are used for such travelers, since these bronzes offer great resistance to corrosion and corrosion fatigue, as well as wear.

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**Occasionally** considerable vibration is encountered in service, especially with vertical twisters, and this, together with the high rate of speed at which they operate, results in a fatigue problem. Unless this is understood and proper precautions are observed in manufacturing, premature failures are liable to occur from fatigue cracks. Such cracks start at a stress concentration or incipient crack, and progress under repeated stresses until failure occurs.

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**The bronze** wire is purchased to specifications covering composition, temper, and physical condition, as well as microstructure; as in the case of steel, the temper of the bronze wire is controlled within close limits. Bronze is not hardenable by heat treatment, as is steel, but depends upon the strains imposed in cold working for its hardness; that is, wire drawing hardens it, and it must be finished with exactly the right degree of cold reduction to the final diameter to have the proper temper for further processing. In the traveler shop where it is rolled into round edge flat wire prior to forming, the flat rolling hardens it still further beyond the original temper imparted by the drawing. It must finish as hard as possible for best wear resistance, but a minimum ductility is required for fairly severe forming operations.

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**The chemical** composition of the bronze governs its wear resistance to a considerable extent, since it is largely the composition of non-ferrous alloys that governs their rate of work hardening, or ability to become hardened during cold working operations. Composition also affects the micro-structure which in turn affects the wear resistance. For best wear resistance, and forming qualities, the grain size of bronzes are held to a maximum of .050 m.m. average grain diameter.

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**Bronze** travelers are made from the rolled wire of proper shape by cutting and forming them in the same manner as steel. They are hardened to just the right degree for forming by the cold working in the flat rolling operation. Hence, when cut and formed in the traveler machines, they are finished with the right amount of temper or hardness and ductility for the service intended. Next they are cleaned by bright dipping in the acid cleaning department and are then ready for polishing.

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**Bronze** travelers are finished by tumbling in very fine polishing agents such as leather meal. They take a high finish without the use of coarse abrasives.

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**It is** difficult to define wear. In fact the apparently simple term, "wear resistance", is in reality a very complex problem. The ability of a part to resist wear depends upon its chemical composition, hardness, and micro-structure. While hardness

is a useful criterion of wear resistance, it is now known that the micro-structure of metals also plays a very important part. For bronzes, a definite and fine grain structure together with the proper composition and hardness is necessary for best wear resistance. It is also known that a martinsitic-troostitic structure is the most favorable for metal to metal wear resistance of steels. Changes in structure of steels, although causing very little change in the hardness, do affect the wear resistance markedly.

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**The manufacture** of ring travelers is, of course, governed by service requirements. When these requirements are known, suitable specifications may be written and used in processing the travelers to insure that they are satisfactory for the purpose intended.

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**Wire** is the raw material for the production of travelers. It is purchased to specifications covering chemical composition, mechanical and physical properties, as well as micro-structure. The steel wire used is a special low carbon composition, made from selected ingots which are carefully processed to preclude defects such as harmful segregations, seams, laps and slivers in the finished wire. The final temper of the wire must be such that it may be rolled into round edge flat wire and formed with sharp bends, without developing incipient cracks or unusual strain at the bends. The temper of the wire is controlled by the tensile test.

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**The grain** size of the steel wire must be also carefully controlled. A fine grain size is necessary to produce smooth edges, after rolling to round edge flat wire. In order to prevent rough edges from coarse grained wire, especially in the large diameters, a maximum A.S.T.M. grain size of No. 5 is specified.

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**The carburizing** quality of the steel is another very important factor. Carburizing is one of the most involved of all the metallurgical operations. To carburize properly, the steel must have the ability to absorb sufficient carbon to convert it from a hypo-entectoid to a hyper-entectoid composition and then heat treat to combine high hardness and good ductility.

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**All wire** is carefully inspected when received for chemical composition, physical and mechanical properties, and for micro-structure. It is also checked for dimensional variations. Since travelers are made to exceptionally close weight tolerances, it follows that the wire from which they are made must be held to closer diameter tolerance than those of commercial specifications. Fine wire is purchased in one quarter thousandth diameters, and medium fine sizes in half thousandths.

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**The first** operation in making the travelers is rolling the round wire to its final shape and size; that is, either round edge flat wire, half round or oval. This is accomplished in flat wire rolling mills especially designed for this purpose. These mills contain two very hard alloy steel rolls mounted horizontally in heavy frames, with special bearings and a powerful driving mechanism. The rolls are mounted so that the space between them may be adjusted to fractions of a thousandth of an inch. This is accomplished by making the top roll adjustable, and it is controlled by a suitable screw and capstan arrangement.

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**Rolling** flat wire requires considerable experience. There are thousands of final sizes required for travelers, and a great many ratios of width to thickness. Therefore, a huge stock of round wire sizes is required for immediate use. The cross section of the finished traveler determines the proper initial round wire diameter, The round wire is reduced and flattened by passing it through a rolling mill and winding it on reels provided with automatic level winding guides. The reels tend to run a little faster than the rolls, and are driven with a belt which may slip. This exerts a slight tension on the flat wire between rolls and winding reel and keeps it straight. Usually, the total reduction to final thickness is approximately 50 percent in thickness, and is accomplished in two or more passes through the rolls. After rolling the wire to the proper cross section it is fed from the reels into the traveler machine. This is a specially designed machine which feeds the shaped wire in by means of friction rolls, cuts it to the proper length, then forms it to the final traveler shape and size, all in one operation. These machines turn out approximately 6,000 travelers in an hour in the large sizes to 15,000 in the smaller ones. The forming tools are designed and made in the traveler shop. Considerable skill and experience is necessary in setting up and operating these machines in order to hold the finished travelers to the close weights and dimensional tolerances required.

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**Then** the next step in manufacturing steel travelers is carburizing. This operation converts the soft steel from a low carbon content to a high carbon content, comparable to tool steel. The high carbon content provides hardness to a high degree and therefore imparts high wear resistance to the travelers. Carburizing is accomplished in batch type furnaces, with the product packed in dry carburizing compound in alloy containers, and heating to temperatures from 1600° to 1700°F for a specified period of time. A phase change occurs within the steel at these temperatures. The alpha iron of room temperature, which dissolves very little carbon, is converted to gamma iron, or austenite, which dissolves very little carbon. At the same time the carburizing compound, composed essentially of carbon in the form of charcoal, coke or bone black plus a carbonate energizer, releases carbon monoxide gas. This gas is the agent that actually carburizes the steel. A very small amount of gas carburizing is also done. The principle is the same as in dry pack carburizing. The parts are placed in the gas tight chamber of a furnace and the work is carburized with carbon monoxide or a hydro carbon.

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**Next** the travelers are heat treated. The first step in this operation is the hardening. This is accomplished by quenching them in water or oil from a temperature somewhat above the critical point of the steel. In this state the steel is martensitic and is very hard and brittle. In or-

der to toughen them sufficiently for springing on the rings, the temper must be drawn slightly. This is accomplished by heating to low temperatures in accurately controlled convection electrically heated furnaces. Such furnaces insure uniformity of the product, especially with a dense charge of small parts.

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**The travelers** are tested at various stages throughout the carburizing and heat treating operation. Hardness, ductility, and microscopic examinations control these processes and insure proper quality. Upon completion of these tests, when it has been established that the quality is correct, the steel travelers are sent to the polishing department.

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**Polishing** is accomplished by tumbling the travelers in various polishing media, starting with fine grit and steel balls for steel travelers, followed by successively finer polishing agents in several operations. This is a slow process, requiring many hours to complete each of the several different stages.

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**A very** high polish is necessary in finishing travelers, to insure smooth running on the ring with the least possible friction. It also provides a smooth surface for the yarn to run on.

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**Inspections** and tests are made throughout the whole process to control style, size, weight, and quality. A final inspection is made by the laboratory to insure the proper quality of the travelers. Hardness is determined by indentation hardness testing instruments such as the Rockwell tester; ductility is measured, fractures are examined, the chemical composition is checked, and the structure is examined by means of the large metallurgical microscope. Specimens are prepared for microscopic examination by grinding cross sections of the travelers to optically plane surfaces by placing the travelers and placing them in holders sufficiently large to provide a good bearing surface, grinding at slow speeds through four or five successively finer abrasives and finishing on triple 0 French emery. The final polishing is accomplished with levigated alumina in water, on a broadcloth wheel. The specimen is then etched with one of the many reagents to develop its structure. Microscopic examinations are made at 100 to 1500 diameters magnification regularly to control the structure of the finished travelers. This is an important step in the control of quality, for it is known that when the micro-structure is properly controlled, in addition to the chemical composition and hardness, greater wear resistance is imparted to the travelers.

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**Steel** travelers are rust-proofed after the polishing operation, and then they are sent to the inspection department where they are examined for finish and to insure against the mixing of sizes, etc. Bronze travelers are so inspected also.

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**Finally** the travelers are counted by weighing on a precision balance which counts them within ten of the correct number to be packed in each box.

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**They** are packed in metal boxes and the boxes are suitably labelled with the necessary information regarding traveler sizes, circle, flange opening, style and lot number and are then ready to be either placed in stock or shipped directly to the consumer.


*Be on hand for the . . . .*

**PACIFIC COAST REGIONAL MEETING**

**of the Wire Association–June 15, 1951, at San Francisco, California**

THE PLACE: Sir Francis Drake Hotel.

THE PROGRAM: A.M.—Registration starts at 10 A.M.

P.M.—Plant inspection trip to California Wire Cloth Corporation at Oakland. Busses leave hotel at 1 P.M.

Cocktail hour—6 to 7 P.M.

Dinner at 7 P.M.—Speaker: Charles Hamman, Columbia Steel Co. who will talk on "The Growing Wire Market of the West."

Technical Session—Paper by Forrest Bales, Supt. California Wire Cloth Corp. on "Quality Requirements of Wire used for Weaving."

Paper by E. J. Crum, R. H. Miller Co. on "Wire Drawing Lubricants."

A feature of the meeting will be a Wire Cloth Exhibit, in which various types will be shown.

*Please make your hotel reservations now, returning the card mailed to you.*
*If you did not receive one, write to Mr. Brown. All wire men cordially invited.*

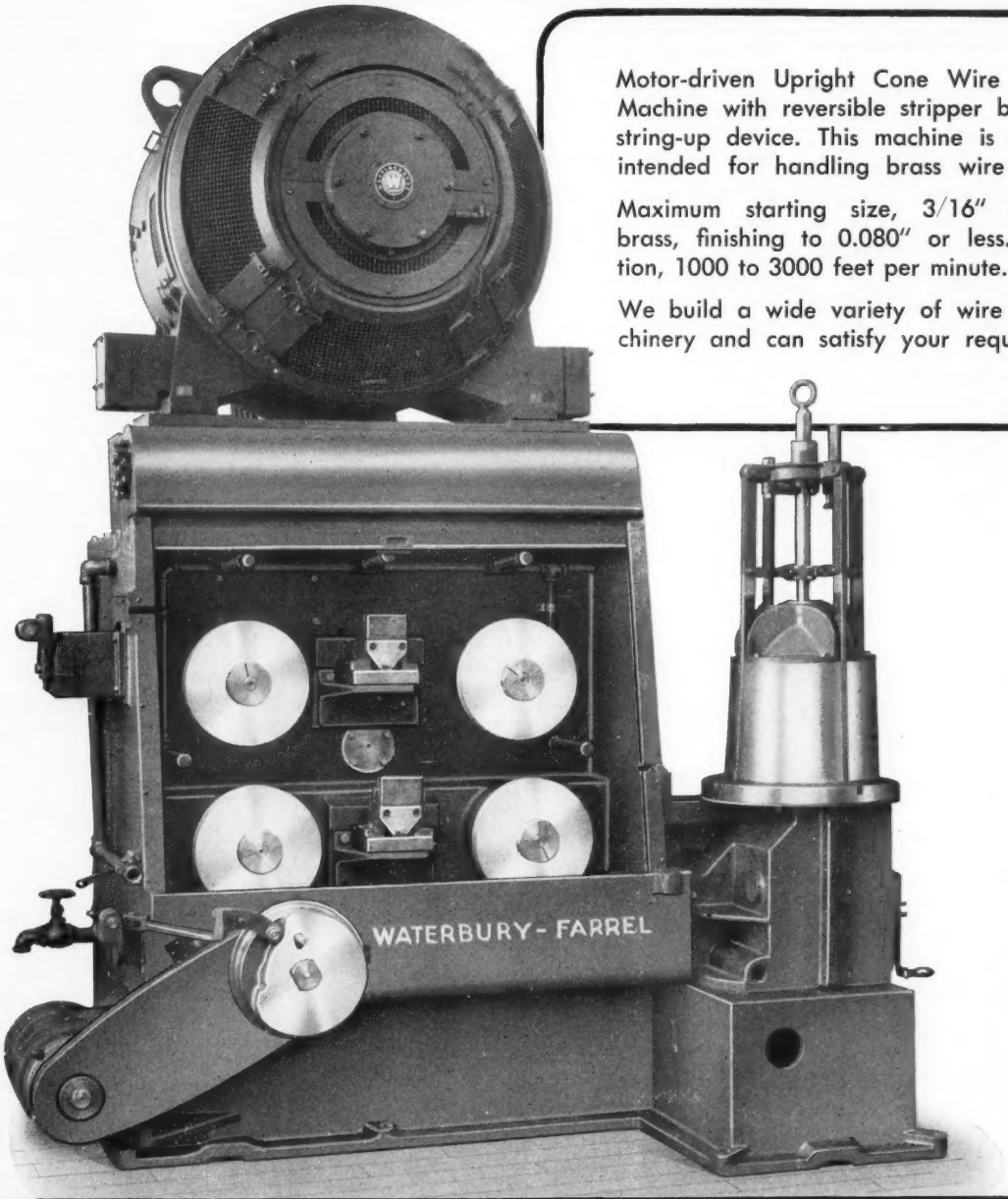
**THE WIRE ASSOCIATION**

**RICHARD E. BROWN, Executive Secretary**

**300 MAIN STREET** **STAMFORD, CONN.**

## Just one in a wide variety of . . . .

# WIRE DRAWING MACHINES




Motor-driven Upright Cone Wire Drawing Machine with reversible stripper block and string-up device. This machine is primarily intended for handling brass wire in coils.

Maximum starting size, 3/16" annealed brass, finishing to 0.080" or less. Production, 1000 to 3000 feet per minute.

We build a wide variety of wire mill machinery and can satisfy your requirements.

FOUNDED WATERBURY FARREL 1851

**THE WATERBURY FARREL FOUNDRY & MACHINE COMPANY**

WATERBURY, CONNECTICUT, U.S.A.

CHICAGO CLEVELAND NEWARK, N. J.

# American Steel and Wire Stainless Steel Plant at Waukegan

**This new stainless steel mill, embodies the newest in equipment and processes. The article describes various departments with particular reference to wire equipment.**

**An entirely** new mill, designated as the Stainless Steel Division, and equipped exclusively to process round ½" and smaller and certain sizes of flat stainless steel wire on equipment designed specifically for the purpose, has been built and placed in operation at the Waukegan, Illinois, Works of American Steel and Wire Company. The objective of operations is to produce quality stainless steel wire in quantity. This United States Steel Corporation subsidiary plant, having a rated capacity of 500 tons per month, is one of the largest stainless steel wire producers in the country. All equipment is so geared in power that it will be possible to increase the rated capacity greatly without the addition of much equipment.

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## Rod Storage

**Raw materials** for the new mill are rods received primarily from the Joliet, Illinois, plant of American Steel and Wire. The latter plant's supply of stainless steel billets is produced at the South Chicago Works of Carnegie-Illinois Steel Corporation, another U. S. Steel subsidiary.

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**Hot-rolled** rods are tested and tagged at the Joliet plant prior to shipment to assure that they meet Waukegan specifications.

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**A revolving,** tilting crane has been provided because it was desired to have flexibility for supplying the rod storage inspection area and the storage bin. The normal flow of material is to unload the car and deposit the rods in racks adjacent to the inspection and welding area from which they move to the rod storage bins.

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**The rod** inspection area is equipped with several storage racks; two jib cranes and hoists; flash welders; pointers; upset testing machine, and bundle compressor. Here the rods are individually inspected, welded end to end into 500-pound parcels and compressed into a neat package for efficient handling in the ensuing annealing operation. In detail, every bundle is given a visual examination for surface defects. Upset tests are made. A second coil is inspected and, if satisfactory, is welded to the first, using the flash welder.

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**This** equipment is new to the stainless wire industry but preliminary tests have indicated that most stainless steels can be welded satisfactorily. As the rods are received they are welded and either sent to storage or to the annealing department for treatment prior to drawing. The bundle is weighed and the weight recorded on the ticket and the duplicate roll tape. Proper designating numbers are used for establishing heat and type indentification on each 500-pound bundle. The bundle is removed from the inspection arm and placed in the bundle compressor by the rod storage crane, where two 500-pound bundles are compressed together into a neat package for proper handling either in the rod storage bin or in the rotary annealing furnaces. In the event rods are going directly to the cleaning house, it is not necessary for this procedure to be executed. Four 500-pound bundles are accumulated in a rack adjacent to the inspectors; the rod storage crane removes the pin carrying four 500-pound bundles to the rod storage area, the rotary furnace annealing department or the cleaning department, as scheduled or allocated by the planning department.

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**There** are two inspection stations provided. The purpose of the foregoing operation is: (1) to check the quality of rods received; (2) to determine accurately the weight of rods in inventory; (3) to eliminate the detrimental effects of small bundles upon the operating efficiency of wire drawing equipment; and (4) to accomplish the same purposes and, equally important, to provide a proper point for the coarse-wire drawing operation.

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## Rod Storage Bins

**Twenty-six** bins have been provided for storage of at least five hundred tons of stainless steel rods. Two 1,000-pound pins are stocked at one time, records being kept of exact weight of rods held in storage. This is emphasized as inventory control is important. This system of weighing lends itself to daily accurate control. Different grades, naturally, are kept separate and sizes, also, as far as possible.

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## Rotary Hearth Annealing Furnaces

**One ton** of rods consisting of two 1,000-pound packages is brought to the annealing department by the rod storage crane. This load is split into two 1,000-pound charges for the annealing furnaces by the overhead crane operated in conjunction with upending machines. These machines are provided for the main purpose of flipping the vertical bundles into a horizontal position so that they may be readily handled by the fork tractor which charges the rotary annealing furnaces. These upenders are operated by the cranemen in both the rod storage and cleaning house cranes.

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**After** the 1,000-pound bundles have been flipped into horizontal position, they are ready to be charged into the furnace. The fur-

naceman or helper who is operating the tractor removes the charge from the upending machine and then backs away and approaches the door of the annealing furnace. This door is operated electrically and automatically opens when the tractor is approaching. The operator is thus in a position to concentrate on placing the charge neatly in the annealing furnace.

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**When** the predetermined cycle is completed, the operator again approaches the furnace door, which automatically opens, obtains the hot bundle from the furnace and deposits it upon the quenching platform located above the quenching tanks. By this time the furnace door has automatically closed again. The operator upon backing away from the quenching tank causes the charge to be lowered into the quenching solution. This operation is completed as rapidly as possible to obtain maximum softness for the austenitic grades of steel and to prevent any carbide precipitation. An automatic timer has been provided for the elevator mechanism so that it will automatically raise the charge to working level at the completion of the quench. The bundle is then placed back upon the upending machine.

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## Annealing Department Equipment

**There** are two large and one small rotary annealing furnaces. All can be operated at 2100°F. All are controlled from a common control house located at the north end of the department. The large furnaces may be operated in any one of three different ways. The most predominant will be the continuous treatment, whereby 1,000-pound package will be charged periodically, resulting in an approximate capacity of 4,000 pounds per hour for each large furnace. In this operation, the furnace temperature is 2100°F. throughout the cycle. The second manner in which the furnaces will be operated is a batch method, whereby the entire furnace will be charged with cold steel, brought up to temperature and cooled at a definite rate until the proper discharge temperature is reached. This method applies only to the martensitic and ferritic grades of stainless steel. The third method is somewhat a repetition of the first. Furnaces may be zoned so that steel is subject to certain temperature requirements as it passes through the furnace. This applies primarily to ferritic grades. The small furnace was so planned that special steel, experimental cycles and small lots can be handled without interfering with the operation of large units. It will also batch anneal finer gages of wire.

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**The quenching** tank is equipped with a heat exchanger which prevents the solution from becoming too hot. Temperatures from 40° to 180°F. will provide equally effective results.

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## Cleaning House

**A stainless** steel cleaning department is quite different from what the carbon steel wire industry com-

FINE WIRE, FINE ART—At the new stainleses steel wire mill just completed at Waukegan, Ill., Works of American Steel & Wire Company, processing fine stainless steel wire on machines like these is a fine art. On five eight-draft machines medium sized wire from .030 to .060 inches in diameter is drawn to either finished wire or processed wire for further drafting. From these wire drawing machines comes stainless steel spring wire, armature binding, rope and weaving wire and wire for processing into very fine sizes. Worker removes a coil from the finishing block which has a variable speed of 300 to 900 feet per minute and is capable of finishing wire as small as approximately .014 inches in diameter. * * * *

STAINLESS WIRE HEAVYWEIGHTS—Specially designed "big-fellows" are these new vertical stainless steel wire drawing blocks at American Steel & Wire Company's new mill in Waukegan, Illinois. Employing vertical motors, the new type wire-drawing blocks require less floor space than old types. Two on the end are called "bull-blocks" for heavy duty and eight in the foreground are for medium wire. All are water cooled and equipped with speed indicators to guide drawing speeds. The two heavies are driven with 100 HP., D.C., 3 to 1 speed range motors; while the eight medium units have 50/60 H.P., 3 to 1 motors. * * * * * * *

monly calls the cleaning house. This is entirely due to the multiplicity of cleaning operations required.

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**Equipment** installed includes tanks for muriatic, sulphuric, and nitric-hydrofluoric acids. Quenching, spray, and coating tanks have been provided for water; and for copper, lime and other wire coatings.

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**Cleaning** is performed in an electrically heated salt bath furnace.

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**In summary** the cleaning has its use for the following purposes:

**(1) To prepare rods and wire for drawing by the oxide process.**
**(2) To clean, passivate and lime coat rods and wire for finish drawing.**
**(3) Activate material for metallic coating**
**(4) Copper coat wire for final drawing to customer specifications.**
**(5) Strip metallic coating.**
**(6) Degrease.**

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**An overhead** traveling crane handles the pins from the upenders in the rotary annealing department to the cleaning house scale.

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**The cleaner** floorman has responsibility for keeping the materials identified during processing. The craneman deposits the treated rods and wire upon a suitable rack on the cleaning house scale. This operation lights an indicator upon the west wall of the wire drawing room and serves to call a ram tractor operator to remove the load to its proper destination in the mill.

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## Acid Handling

**To accomplish** the various functions in the cleaning house, it is necessary to utilize different acids, namely: muriatic, sulphuric, nitric, and hydrofluoric. The muriatic (hydrochloric) is used for activation; the sulphuric for neutralization; and the nitric-hydrofluoric for passivation. All of the acids are handled in carboys.

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## Wire Drawing

**Due to** the complexity of stainless steel requirements, wire-drawing equipment has been set up to produce many different finishes.

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## Coarse Wire Drawing

**All** coarse-wire drawing equipment is variable speed. This feature has been incorporated for several reasons: (1) actual optimum wire drawing speed for stainless steel is variable; (2) maximum flexibility is required; and (3) due to the wide range of sizes it is expected to produce, it would have been necessary to have over twice as much machinery if set, constant speed units were installed.

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**Coarse-wire** drawing equipment includes the following machines:

**(1) Two heavy-duty 100-horsepower motor blocks.**
**(2) Eight medium-duty motor blocks.**
**(3) Four four-draft continuous machines.**
**(4) One six-draft continuous machine.**

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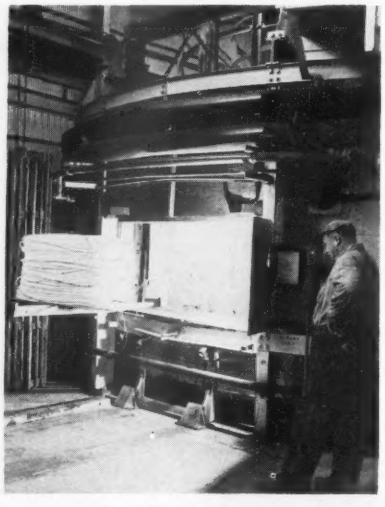

**HOT (STAINLESS) RODS—One thousand pounds of red-hot stainless steel rods are removed from one of the new rotary hearth furnaces of the recently completed stainless steel wire mill at American Steel & Wire Company's Waukegan, Illinois, works. The furnaces, heated to about 2000°F., are controlled electrically and used to heat treat stainless rods, preparing them for drawing into wire.**

**Auxiliary** equipment includes flash welders, rod butt welder, a wire butt welder, four rotary swaging machines, six roll pointing machines, three flipper reels, twenty-eight miscellaneous revolving reels, and twelve 1,000-pound electric hoists.

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## Heavy-Duty Motor Blocks

**The two** vertical-spindle, heavy-duty motor blocks are equipped with 26-inch and 30-inch interchangeable blocks and strippers. The blocks and die-holders are water cooled. They are driven with 100-horsepower direct-current, three-to-one speed range motors, which results in a block speed varying between 17 and 51 revolutions per minute. Thus, when using 26-inch blocks, these machines have a speed range of 115 to 345 feet per minute. These two machines form one work station.

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## Medium-Duty Motor Blocks

**Eight** medium-duty motor blocks are equipped with speed indicators. Two rotary swaging pointers are provided for sizes 0.200-inch and coarser, and two roll pointers for sizes 0.250 to 0.0625-inch. Like the heavy-duty motor blocks, these machines have water-cooled blocks and die holders. For flexibility, four machines are equipped with 26-inch blocks; three have interchangeable 22 and 26-inch blocks; and one, 22-inch and 16-inch interchangeable blocks. These units are powered with 50/60 horsepower, direct-current, three-to-one variable speed motors, which result in speeds of 44 to 72 revolutions per minute. Thus, the available speed range for 26-inch blocks is 162 to 499 feet per minute; on 22-inch blocks, 138 to 414 feet per minute; and, lastly, on 16-inch blocks, 101 to 303 feet per minute. The stripping capacity is five hundred pounds for 26-inch blocks; 400 pounds for 22-inch blocks; and 300 pounds for 16-inch blocks.

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## Four-Draft Continuous Machines

**The four** four-draft continuous wire-drawing machines are likewise equipped with different sizes of finishing blocks. Primarily, the process wire is wound on 26-inch blocks and two machines are so equipped; three have interchangeable 26-inch, 22-inch, and 6-inch blocks so that it is possible to use these machines as wire processing units. All blocks are air and water cooled and die boxes are also water cooled. Each spindle of each machine is driven by a separate three-to-one speed range, 25-horsepower, direct-current motor. This results in finishing speeds of 200 to 600 feet per minute using the 26-inch block; 169 to 507 feet per minute using the 22-inch block; 123 to 369 feet per minute using the 16-inch block. Stripping capacity handles 300-pound bundles for the 16-inch blocks; 500-pound bundles for the 22-inch and 26-inch blocks. These machines are designed to finish wire from 0.062 to 0.150-inch diameter. In one machine, the blocks may be used singly or in pairs, thus

providing a unit similar to a bench.

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### Six-Draft Continuous Machine

**The six-draft** continuous wire drawing machine is quite similar to the four-draft units and the same features are incorporated. This machine will finish on 16-inch blocks having a capacity of 300-pound bundles. Each spindle is driven by separate three-to-one speed range, 15-horsepower, direct-current motor which results in finishing spindle speeds of 250 to 750 feet per minute. The machine is designed to process wire having a maximum size of 0.150-inch and finishing 0.080-inch and finer.

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### Fine-Wire Drawing

**The equipment** incorporated in the fine-wire drawing department is as follows:

**(1) Five 8-draft, 8-inch and 12-inch finishing block machines having fixed reductions between drafts for proper stainless practice. The finishing block has a variable speed of 300 to 900 feet per minute, and is capable of finishing wire to as fine a size as approximately 0.020-inch.**

**(2) Ten 12-draft wet-wire machines complete with spooling attachment. These units are also capable of finishing 8-inch coils. Each machine has a maximum speed of 2,000 feet per minute with an expected operating speed of 500 feet per minute. These are used for drawing wire as fine as 0.004-inch.**

**(3) One 10-wire, 5-draft tandem machine. This machine has a speed ranging from 100 to 400 feet per minute, and is capable of finishing on spools only.**

**(4) Three 16-draft machines, which are used primarily for drawing very fine wire.**

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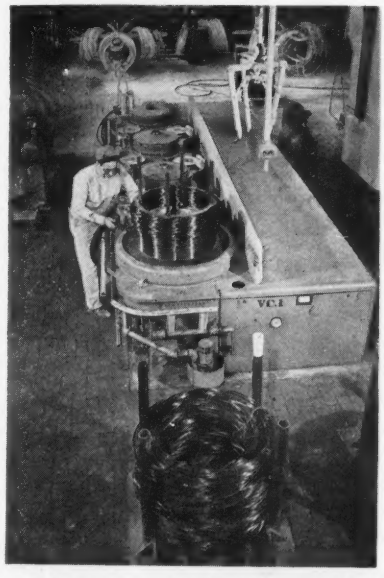
### Fine-Wire Bright Annealing

**All fine** stainless steel wire shipped in the annealed condition is continuously bright annealed. A 30-wire unit has been installed for the bright annealing of fine wire. Up to a set size range, speeds may be increased to keep capacity at a uniform rate. This equipment is furnished with spool-handling facilities for both the pay-off and take-up ends. The furnace itself is electrically heated by means of non-metallic resistor elements. Tubes through which the wire passes are made of Inconel to withstand the high temperatures involved. An atmosphere of dissociated ammonia is employed, which is really a mixture of hydrogen and nitrogen. To conserve consumption of ammonia, the tube diameters are only ⅛-inch. A double tube arrangement minimizes the consumption of ammonia and decreases the flow. Care is taken at all times to insure proper working conditions, as even a slight amount of air or moisture in the tubes will cause the production of tarnished wire.

★ ★ ★

**A second** unit is a 14-tube furnace and was installed to bright anneal the coarser sizes ranging from 0.030-inch and up to 0.090-inch. This unit has been equipped with cranes, reels, and a conventional strand takeup as auxiliary equipment.

★ ★ ★



DRAWING WIRE, STAINLESS STYLE—It takes many careful steps to draw stainless steel wire into its proper finished size. An intermediate job is performed on modern continuous drawing machines like this one where heat-treated wire is drawn to a next-to-finished process size before further careful heat-treating and drawing. A new stainless steel wire mill at Waukegan, Ill., works of the American Steel & Wire Company, U. S. Steel subsidiary, is equipped with three of these 4-draft, continuous wire drawing blocks. Worker takes a gage measure of the wire near the last die. * * * * *

### Strand Annealing

**A 12-wire** strand annealer has also been installed. Most annealing will be performed in the batch rotary annealing furnaces, and the installation of this equipment merely aids in processing special products for various requirements, such as martensitic grades of stainless steel.

★ ★ ★

### Tin Coating

**Stainless** wire is primarily tin coated for armature binding wire. The tin is not applied as a protective coating but acts primarily as an aid to automatic soldering by the user. It is the practice to tin and spool in one operation.

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**The equipment** consists of cleaning, washing, and flushing tanks; gas-fired tin melting furnace and conventional spool and takeups. A feature of the spooling take-up is the fact that torque motors are employed, making it possible to operate at predetermined tensions.

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### Straightening and Cutting Equipment

**Three** wire cutting machines have been provided for cutting 1/16-inch to ½-inch wire, to meet requirements that various types and finishes be straightened and cut. These include soap and grease drawn wire.

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### Centerless Grinding

**To obtain** a superfine finish on certain grades of products, two centerless grinders have been provided. They are so located that one operator can handle two machines, especially where the particular wire requires a rough grinding and a fine grinding operation. Only straightened and cut wire is centerless ground.

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### Cold Rolling

**Considerable** tonnage of flat wire will be made from a process round wire. Two new cold-rolling machines complete with all necessary facilities have been provided. One is an 8-inch machine and the other a 6-inch machine. A product such as cotter-pin stock will be made on this equipment. Provision is made so that wire can be given one, two or three passes through the rolls to obtain an ultimate quality product. It is important that all process wire be accurately gaged so that the final product meets user specifications.

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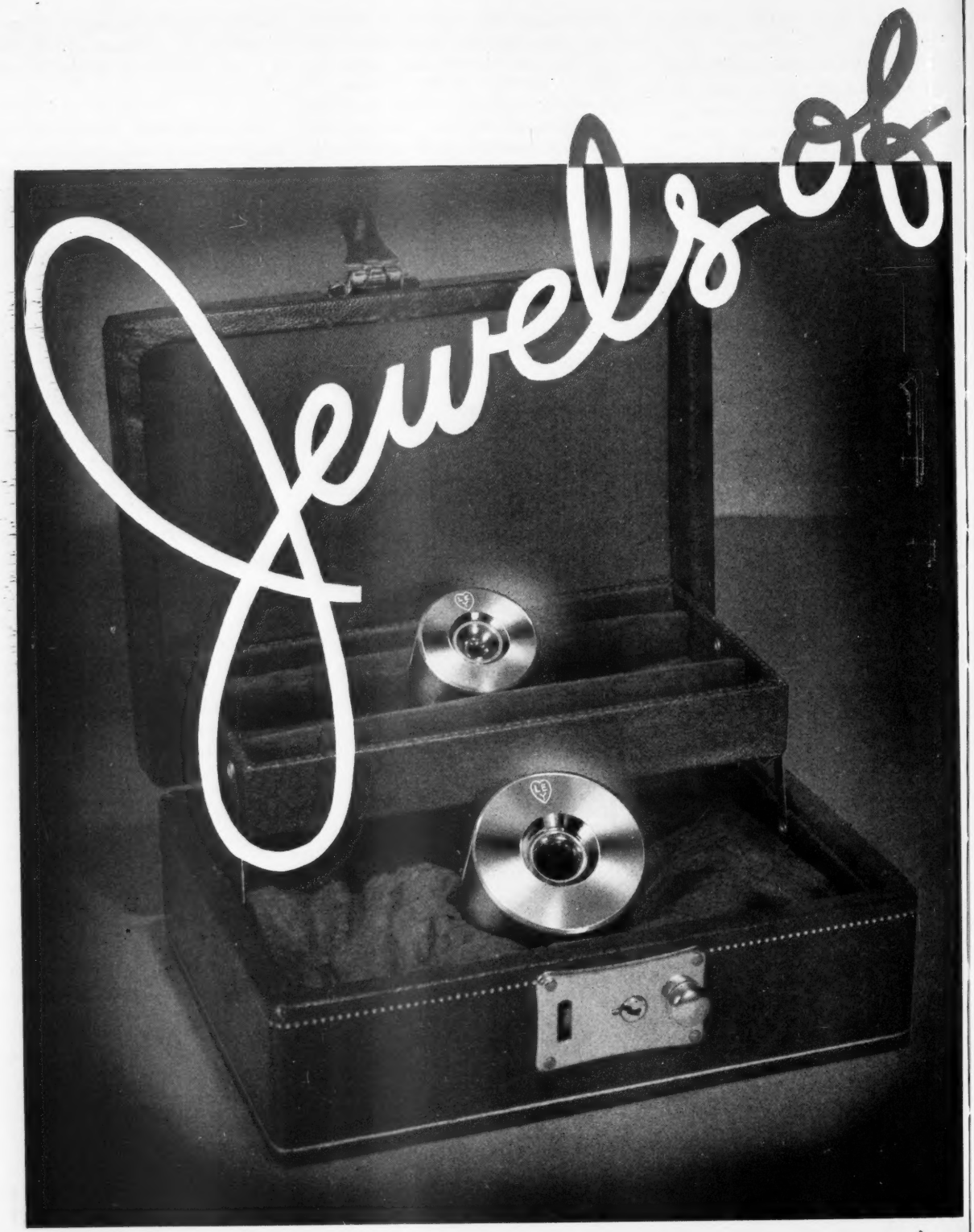
### Testing Laboratory

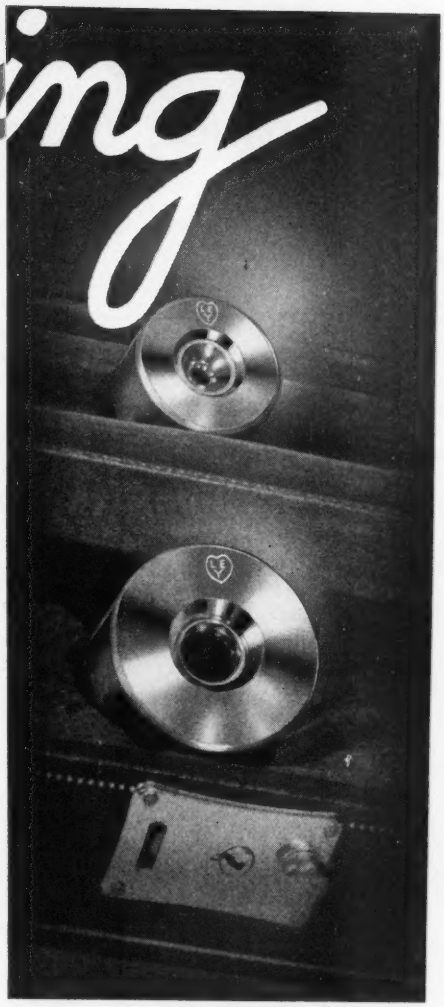
**The latest** in testing equipment has been installed in the testing laboratory of the new plant so that all products may be controlled throughout their course of manufacture. Three tensile testing machines are available that cover the entire testing range for products

(*Please turn to page* 439)




HARTLEY TOOL & DIE COMPANY
THOMASTON, CONN.

# wire drawing



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### GUARANTEE

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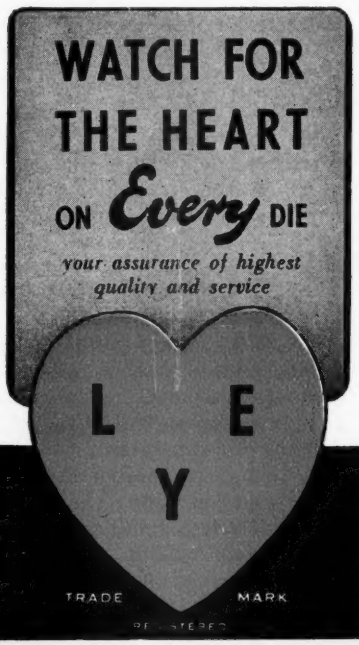


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# Increasing Productivity in Old Plants Through Modern Materials Handling

By Leo J. Pantas
Works Manager, Salem Division
Yale & Towne Manufacturing Company
Salem, Virginia

**This talk was delivered last October before a meeting of the Industrial Packaging and Material Handling Engineers. The lecture was part of a course given jointly by the S I P M H E and the Technical Institute of Temple University. The author's company, while making materials handling equipment, has problems as a manufacturer to which the principles set forth apply.**

**The re-appearance** of priorities, allocations and other controls, shortages of materials and manpower, panic buying, and other items in our inventory of revived horrors, serves today to dramatize the fact that there is still a wide abyss between what we have and what we need. American industry is faced again with the compound problem of serving both the prodigious requirements of the country's military organization and the seemingly insatiable demand for consumer goods of all descriptions. During the past few years, fortunately, we have had a respite of comparative peace during which we were able to replace some equipment and to accomplish a considerable amount of new plant construction; but this progress, postponed during World War II, has now been interrupted by the new mobilization of our country.

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## Why Old Plants Must Be Brought Up To Their Production Peaks

**The mandatory** and voluntary restrictions on materials, together with the panic in the market place, seem to be proof positive that industry is even now hard-put to meet, at the same time, increased civilian demands and the swollen needs of the military. If the "hot-again, cold-again" war has in reality taxed industry's facilities to the full, there remains but one answer: We must either increase productivity or lower our standard of living. In fact, only a few days ago, the Chairman of the President's Committee of Economic Advisors viewed the first alternative—increased productivity—as the only means by which the nation could carry both the civilian and military burden.

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**One might** say that the obvious course to follow to attain expanded output would be to build new, streamlined plants with ingenious mechanized assembly lines. Unfortunately, not only is there little time, but there's also a growing shortage of building materials and other scarcities which, together with the present shortage of investment capital, preclude the immediate construction of many necessary new plants. Of the open choices, one practical solution, then, is to work with existing plant facilities so as to bring them up to their production peak.

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## Three Quarters Of All Plants Are Over 25 Years Old

**Which** brings me to my subject: modern mechanized materials handling methods as a prime tool by which to harvest the fullest capacities of existing plants, old or new.

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**By recurring** demonstrations, it has been shown time and again that handling of all sorts is the "soft underbelly" of production, the sphere of greatest vulnerability in cost and efficiency, the weakest link in the production process. On the other hand, it has been shown, with equal force, that it is in the sphere of handling that industry can make almost incredible progress in reducing cost, in increasing unit output per man-hour, and in vitalizing over-all production efficiency. Strengthen this "soft underbelly" with modern handling techniques and you take the long step forward toward increased productivity in existing plants—even the oldest ones.

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**The recently** completed Census of Manufacturers discloses that 72% of all industrial buildings in the United States are over 25 years old. Of these, half are from 35 to 45 years old, another quarter are over 45 years old. This plethora of aging American plants underscores the scope of the problem we are here to discuss today. Old plants and buildings are more likely than not to pose complications which, at first glance, seem to exclude efficient manufacturing. While they may require a very different approach from a new plant, ideally systemized with modern mechanized handling, I believe a combination of engineering ingenuity and imagination, abetted by some modern mechanized materials handling equipment and techniques, can often make a more efficient operating unit of even the oldest plant.

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## How To Determine "Real Age" Of A Plant

**Some** old-plant problems include peculiarities and shortcomings in floor strength, low ceiling heights, poor placement of supporting pillars, inadequate aisles and storage bays, and similar disadvantages. But it is not the chronological age of a plant which truly signifies its age, but rather the extent to which these and other disadvantages exist. From a materials handling point of view, and therefore from a production point of view, even a newly-built plant is really an "old plant" if it has these characteristic disadvantages. In a sense, then, it can be said that a plant has both a chronological age and a technological age, and that all newly-built plants are not necessarily technologically modern.

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**With** this in mind, let's look at how some companies are achieving technological modernity in old plants hitherto plagued by deficiencies in layout and structure:

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## Gearing Receiving And Shipping Operations For More Productivity

**One** of the most crucial points in all materials handling operations is how incoming shipments, whether from highway trucks or freight cars, are treated. Obviously, it's an advantage to have interior docking facilities at just the right height for loading, but that's not usually found in old buildings. Ramps are one solution that's commonly used where there is a disparity in truck bed height and floor level. If the distance between the highway or rail carrier and the dock is small, simple bridge plates can be used. More expensive, but usually more satisfactory, are hydraulic ramps which can be adjusted to practically any carrier height.

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**Use of** ramps, both inside and outside the plant, however, cause other problems. Since the tractive effort required of lift trucks grows by leaps and bounds with increasing ramp-angles, there is a definite practical grade limitation here, usually 10%.

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**Where** the angle for loading or unloading is initially too great for the use of a ramp, the solution may be excavating, or filling in the receiving bays to bring truck beds nearby even with dock levels. In leased buildings where a minimum of such capital construction is desired, the answer may very well be portable conveyors for unloading.

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**Some old** plants are faced with the problem of loading facilities designed for trucks formerly equipped with side doors. This problem is further complicated because there is often no room for the truck to back up to the loading platform in the usual manner. This has been solved by one company by installing a hydraulic bridge piece that scoots out from under the door of the building at right angles to the tailgate of the truck to make a very satisfactory platform. In addition, when there is no such vehicle to be loaded, the bridge piece is restricted so that the alleyway is clear for thru vehicles.

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**Another** common problem in old plants is the lack of headroom and clearance for today's enlarged highway trucks and railroad cars. In addition to receiving doors being too small, many times the receiving area inside the plant is restricted in size because of process operations.

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**One company** solved both of these problems by breaking an opening through the outer wall of the building, about ten feet above ground level, to accommodate a gravity wheel conveyor. Now, incoming shipments are taken from the truck or freight car, placed on the conveyor, and shipped to storage or process areas throughout the plant without any additional loading dock or accessories.

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## Overcoming Structural Limitations Of Old Plants

**Once the** goods being received are inside, more problems arise in old plants. From a materials handling standpoint, a one-story structure is preferable to a multi-story structure, except for certain process industries. One-story buildings generally afford more usable space per dollar of investment than any other, partly because of the space requirements of elevators. Furthermore, in a one-story building, relatively new types of roof construction with longer spans, arched and curved welded trusses, designed to support only the roof plus any snow load, offer economies in construction costs.

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## The Problem Of Elevators

**In multi-story** buildings, elevators may also prove to be a bottleneck in the flow of materials. This can partially be avoided by taking into full consideration the volume of material flow and then planning installation of as many elevators with sufficient capacity and door openings as needed to admit and accommodate the loaded trucks.

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**Automatic** systems of signaling and control help reduce truck delays at elevators. The time required for an elevator to respond to a call can be cut by installing the signal switches far enough in front of the trucking lines to enable truck operators to call in advance and by locating the elevator home station at a midpoint in the shaft.

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**Other** ways to prevent elevator delays are to put loads on live skids or dollies which the elevator operator can push on or off or to provide the elevator operator with a motorized hand truck for handling standard skids or pallets. Only the load waits in these two systems.

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## The Problem of Floor Strength

**Elevators** bring up the question of floor strength. There is usually ample floor capacity on ground floors to carry safely almost any type of industrial truck and its load. In extending their operation to upper floors of buildings, the question of adequate floor capacity arises. Since building construction varies widely, it is practically impossible to make recommendations for safe practice without a detailed study of the plant.

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**An approximate** weight of trucks that may be operated safely on a given floor can be indicated by a simple study. Numerous tests made by our company's materials handling manufacturing divisions show that industrial trucks impose a dynamic load on the floor of about 25% more than the static weight of the loaded truck. Such test results were obtained in our Materials Handling Testing Laboratories by using strain measurements on the structure and special test setups.

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**Based** on these data, a safety factor of 50% over static load is advised in computations for dynamic floor loading. This means a safety factor of 1.5. However, it is only one of two factors to consider. An industrial truck exerts its weight for all intents and purposes on a single point. Although the load is actually spread over the wheelbase and the tread of the tires, this is a relatively small area compared to the floor area. This concentrated load produces a bending moment approximately double that produced by a uniform load on the beam structure of the floor. In test, the bending stress actually was only increased 85% so that a safety factor of two is more than ample.

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**Combining** these two safety factors makes an over-all safety factor of three to one for stresses in the floor slab that are imposed by a truck that is in operation.

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### A Simple Method For Determining Floor Loading Capacities

**The next** question is how much floor area is devoted to carrying the weight of the loaded truck. This is usually the aisle area. If the total area of the aisle is multiplied by the capacity of the floor, the total capacity is obtained. Thus a 10-foot aisle, 20 feet long with a capacity of 250 pounds per square foot, would have a total capacity of 10 times 20 times 250, or 50,000 pounds. Dividing this number by three (the safety factor), the permissible loaded weight of trucks would be 16,000.

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**If two** or more trucks could pass each other over this area, their combined loaded weight could not exceed the total 16,000. This point is very important, *particularly around elevators,* and should be remembered when reinforcing old plants. In addition, the area around elevators usually gets more than its share of traffic, and the fatigue load is liable to be greater. An additional safety factor should therefore be incorporated into the floors near elevators.

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**These** calculations are made for concrete slab floors which, according to architects, are one of the more desirable types for buildings used to support industrial trucks. If other types are used, particularly wood, wheel loading studies may be necessary, since only a few boards or planks may receive the entire load.

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**If, however,** a wooden or similar type of floor will easily support a uniformly distributed load of the magnitude desired, some simple device like steel plates will often serve to disseminate the concentrated load of the wheels over several planks or boards.

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**When** computations indicate that the maximum capacity of the floor is being approached, a competent construction engineer should make a further study, but if there is a generous safety factor, no further effort is usually necessary.

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### Reorganization of Old Plant for Better Flow of Materials

**A good** example of how the major objectives of the handling problem can be undertaken by the physical reorganization of an old plant is the project Yale & Towne is undertaking at its Stamford Division. This program is designed to lower the break-even point in our manufacture of Yale locks and builders' finishing hardware.

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**In the** Stamford plant we are confronted with the consequences of venerability. The first building was erected in 1868, and since then, additions were made until 1928. The plant is now a series of six-story buildings, linked together in the form of a huge "L" sprawled over a 29-acre site. Inside this "L" of buildings, on a center quadrangle, are miscellaneous buildings for metal processing, woodworking, power, shipping, and receiving. Production has in the past consisted of specialized operations for each product regardless of where the product had to travel—from building to building, or from shop to shop—in the process.

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**The Stamford** General Manager is eliminating this method of manufacture and in the new procedure each of the six floors will have a continuous production system based on these classifications of product:

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**Raw material** brought into these floors—and in this case, it consists of material upon which primary operations have been completed in foundries and press shops—will go through a one-floor cycle of secondary operations. Each floor will have four similar areas: an area for secondary machining operations; a storage area for machined parts; an assembly area; and a packaging area.

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**Production** is planned to take place on a straight line system. Parts will be mechanically handled on belt and hangar conveyors, and monorail hoist systems as well as mobile equipment such as hand trucks, motorized hand trucks, and lift trucks.

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**Overall,** our Stamford Division is consolidating its present 92 departments scattered over the entire plant into 44 locations in the "L" of buildings. Each of the six floors, in effect, will be a single-story unified operation for a group of related products. The present indications are that a movement economy of about 50% will be achieved.

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### How To Achieve More Efficient Handling In Separated Buildings

**Where a** plant must use several buildings of the multi-story variety, additional handling headaches are often introduced. Too often, in the past, these buildings were not connected, and material sometimes has to proceed from the fifth floor of one building to the fifth floor of the next via an arduous trip down an elevator across a roadway and up another elevator. There have been some interesting methods devised to correct this evil. Here are a few:

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**Floors** between the buildings can be connected with bridges which serve as truck runways. This will eliminate the tedious elevator trip and will speed handling of materials from building to building as well as leaving the elevators free for other work. If there is bulk material to be handled, a bulk conveyor, of the screw, vacuum, or blower type, can be used. For handling cartons, pallets, and other uniform loads, a tray type or gravity roller conveyor has been found successful. Often maximum economy is achieved by complementing a truck bridge and runway with a conveyor.

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**An ingenious** idea for connecting two multi-story buildings was developed by a large paper box company. This manufacturer had two buildings that were separated by a gap of 10 feet, although for reasons of "unifying" the property, the outer walls had been connected. Practically all inter-floor transportation was inter-building transportation. Material went down in one elevator and up in the other. There were two small elevators in one of the buildings, a six-story affair which served as the factory, and an old elevator in the six-story adjacent warehouse. The two elevator shafts in the fac-

(*Please turn to page* 434)

# GOSSIP from BRITAIN

**A letter** recently received from a firm manufacturing machinery in California evinced the opinion that owing to the nationalization of the steel industry in Britain no business could be done by U.S.A. firms here. On the contrary, orders being placed abroad are increasing for all kinds of machine tools and import licenses for dollar goods are being granted with increasing frequency. Wire working, not being seriously affected by nationalization, offers better chances for sales of plant than for many years past.

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**German** manufacturers of wire and wire machinery are reported to be extending their operations considerably and a correspondent resident in Spain reports to the writer that several of these interests have made preparation to produce in Spain and Portugal. An Italian reports similarly for that country. Several British firms have formed connections with German interests also. For instance, The Marshall Richards Machine Co. Ltd., are making a barbed-wire machine by arrangement with the Malmedie Co. of Dusseldorf, whilst the latter concern is making wire-drawing machines of British pattern.

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**Observers** are puzzled that the Monopolies and Restrictive Practices Commission has not yet issued any report concerning the wire trade. The Commission has under review chain link fencing and most types of non-ferrous wire. Reports regarding other industries are being made regularly. Chain link was one of the first to be announced for scrutiny into the association practices.

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**Every** few days brings news of further price increases and today's notifications (April 4th) include wire netting up 90¼%; galvanized staples up 6d to 1/6d per cwt., according to gauge; galvanized wires up 6d to 2/per cwt. according to gauge; barbed wire 5d per reel. Rises are also recorded today in mild drawn Bright, annealed, coppered and tinned wire; electrolytic copper (£8 per ton), pig lead (£26), zinc (£11). All non-ferrous scrap prices are advanced. Sulphuric acid advances between 26/6d and 33/9d per ton according to strength. Alongside all these advances, which must also increase the prices of domestic wire goods of every kind, a government order limits the export of manufactures of copper and copper alloys to approximately half the rate prevailing in the first six months of 1950.

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**The shortage** of zinc and the search for suitable substitutes re-


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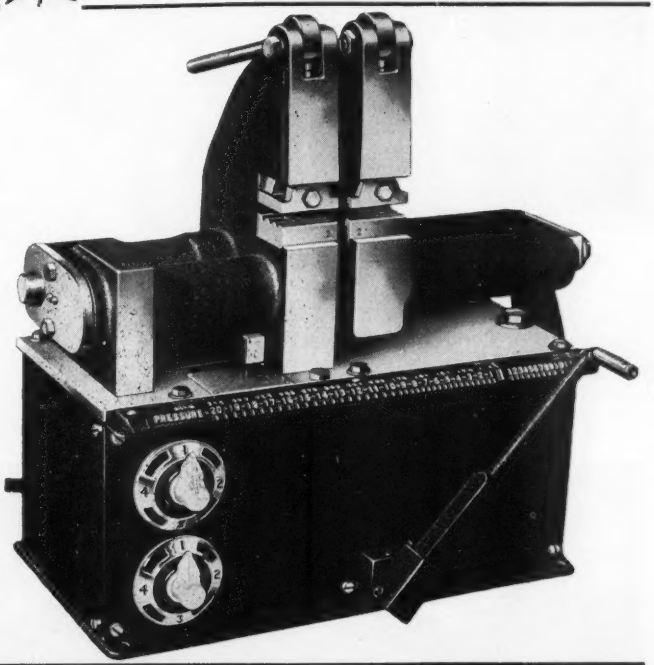
Welding capacity .080" to .375 diameter STEEL wire

The Model T-L Welder which is a self-contained unit suitable for various types of Butt welding, is equipped with individual hand clamps, and a single control lever for the spacing operation, applying the upset spring tension, and contacting the welding switch.

This unit can be supplied for either bench mounting, overhead crane, or mounted on 4-wheel truck.



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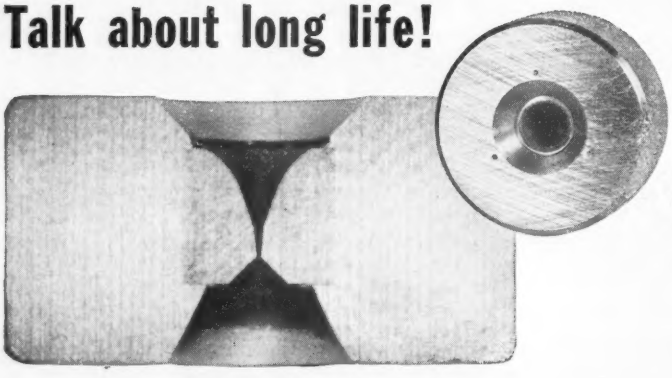
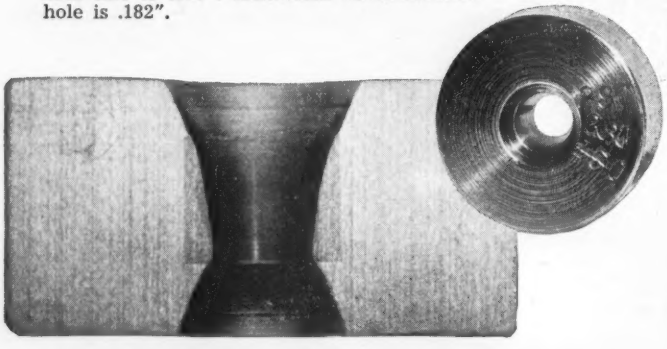


**Original Die**

Unretouched photo of Carboloy R3 wire draw die, as delivered to manufacturer. Starting hole size is .015". Maximum recommended hole is .182".



**Refinished Die**

Unretouched photo pictures Carboloy R3 die finished and refinished many, many times to .290", almost twice the recommended maximum. Surface casing stampings of bore sizes were so numerous they had to be machined off to start afresh.

## Each refinished die as good as new because it's CARBOLOY *Cemented Carbide!*

A wire die of Carboloy Cemented Carbide, *the hardest metal made by man,* can live one good, long, profitable life right after another.

When the starting hole in your original Carboloy die *finally* wears beyond hole size, just refinish it to a hole size needed for your next largest die diameter. And so on!

Result: a succession of ten, fifteen or more practically brand-new Carboloy dies for sensational performance, savings, and production in your wire drawing. (Refinishing will not impair nib support or decrease transverse or longitudinal strength.)

Carboloy Wire Dies guarantee you efficient, cost-saving performance exactly right for the job. Their uniform high quality is assured by twenty-nine separate rigid quality tests and the world's finest carbide production facilities —plus the Carboloy policy of continual grade improvement to meet metallurgical developments. In addition, our comprehensive service program outlined here is at your beck and call. Read about it and mail the coupon for the information you'd like.

*Specify* CARBOLOY

# CARBOLOY WIRE DIES
## AND LARGER HOLE SIZES

### Carboloy Service Program

#### Technical Literature

Complete, fully illustrated Carboloy Die Service manual shows you how to maintain carbide dies for extra production, savings, longer die life.

#### Field Engineers

Twelve Carboloy Field Engineers, with more than 200 years of experience in the wire die field, are available to help you get maximum die life and productivity.

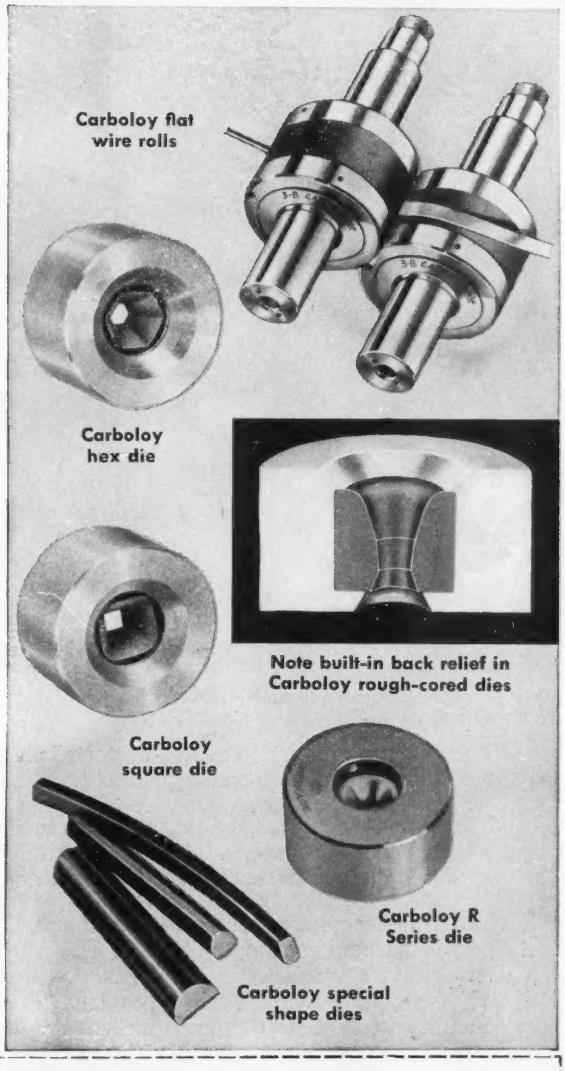
#### Training School

Free instruction is available at all times to refresh older workers, teach newcomers the latest carbide die application and maintenance methods at the Carboloy Customer Die Training School in Detroit.

#### Die Service Centers

Solve your toughest resizing and refinishing problems, conserve vital carbide dies by using the extensive facilities of Carboloy Die Service Centers in Detroit, Chicago and Pittsburgh.

"Carboloy" is the trademark for products of Carboloy Company, Inc.


Carboloy flat wire rolls
Carboloy hex die
Note built-in back relief in Carboloy rough-cored dies
Carboloy square die
Carboloy R Series die
Carboloy special shape dies

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**Cemented Carbide Wire, Bar and Tube Drawing Dies**

Carboloy Company, Inc.
A General Electric Affiliate
11171 E. 8 Mile Blvd., Detroit 32, Michigan

Gentlemen: Please send information about—

- ☐ Field Engineers
- ☐ Training School
- ☐ Die Service Centers
- ☐ Die Service Manual D-119

and also:_____
(Mention types of dies you are interested in.)

Name_____ Title_____

Company_____

Address_____

City_____ Zone_____ State_____

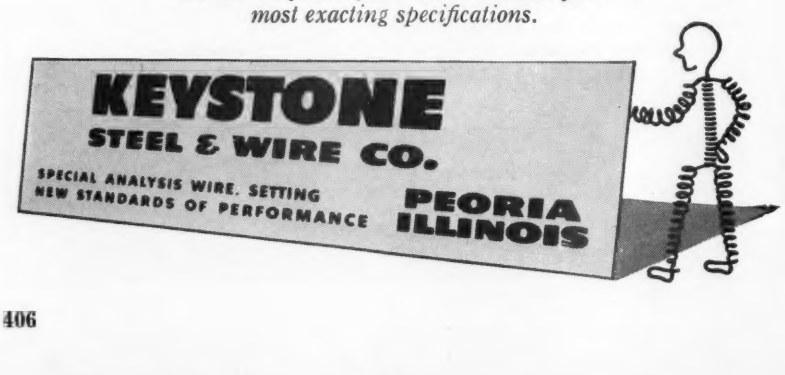
# Speeding Rivet Production

According to production men, Keystone Tubular Rivet Wire has what it takes to increase production efficiency.

The special techniques and processing methods developed by Keystone have produced a tubular rivet wire with *exceptional* forming qualities for both extruded and drilled rivets.

The wire recommended for *drilled* tubular rivets has the proper hardness for longer drill life. The wire recommended for *extruded* rivets has uniform metal flow qualities required in extrusion headers. Both types have exactly the right ductility for cold heading and excellent roll crimping.

*Regardless of the performance demanded in your products, consult Keystone for the wire to meet your most exacting specifications.*





calls to memory the historic wordy battle which took place in the 1930's between Capt. Whitehead of The Whitehead Iron & Steel Co., and Lt. Commander Goeffrey Rylands of Ryland Bros. Ltd., on the merits of hot galvanizing of wire and electro-galvanizing. It took the form of a lengthy series of letters to the editor of "The Ironmonger", a premier paper in this country for the hardware trade. It grew so vitrolic that the editor had to close the correspondence. Capt. Whitehead, who advocated the advantages of electro-galvanizing, was an early pioneer of this method and has lived to see his advocacy fully justified. Time marches on. Shall we witness further clashes amongst the giants on new methods which are bound to come urged on by world shortages?

★ ★ ★

**Dismissal** notices were given to 75 men employed at Rists Wires and Calbes Ltd., of Newcastle-under-Lyme recently. Mr. D. A. V. Rist, the Managing Director, in explanation, stated that the firm was now getting only one-third of the copper used in November and December last. This is typical of what is happening throughout the industry. Many firms, to obviate sacking men are cutting out shifts.

★ ★ ★

**Hydrochloric** acid is more commonly used for pickling here, but sulphuric acid shortage is troubling some wire drawers who are searching for substitutes. Unfortunately, beyond mechanical aids, such as descaling machines and acid recovery plant (which in the main is beyond the pocket of the smaller producer), there is little to offer of practical value. A report in this country states that some alleviation of the situation may come from Egypt and Italy where old sulphur mines are to be re-opened.

★ ★ ★

**The death** occurred suddenly on March 28th of Mr. Charles Jones, managing director of the wire rope and electric cable plant manufacturers, Hanson & Edwards Ltd., of Warrington. He was a notable figure in the cable world and his knowledge will be a loss to the industry.

★ ★ ★

## Government Wire Production Information

### Bibliography of Technical Reports

**The thirteenth** volume of the **Bibliography of Technical Reports** (January-June, 1950) is now indexed according to subject, according to the Office of Technical Services of the U. S. Department of Commerce.

★ ★ ★

**The new** index is the tenth to be issued by O. T. S., volumes 7, 8, 9 and 14 still remaining to be indexed.

★ ★ ★

**The Bibliography of Technical Reports,** issued monthly lists additions to the 150,000-document Office of Technical Services collection of foreign and domestic reports. Together with the "Technical Reports Newsletter" it helps provide U. S. business firms with the highlights of federal and non-confidential technical research.

★ ★ ★

**Copies** of the **Subject Index to Volume 13** may be purchased from the Office of Technical Services of the U. S. Department of Commerce, Washington 25, D. C., at $1 per copy. Also available from O. T. S. at $1 each are the indexes to Volume 12, Volume 11, Volume 10 (February 1949 issue) and Volume 6. The indexes to Volumes 2 and 3 are available at $.35 each. Check or money order payable to the Treasurer of the United States should accompany all orders.

★ ★ ★

### Creep of High-Purity Aluminum

**Recent** investigations by **Wm. D. Jenkins** of the **National Bureau of Standards** have led to significant fundamental information on high-purity aluminum—specifically the effects of stress and sudden changes of temperature on creep behavior.[1] The ability of aluminum to produce, with added elements, solid-solution alloys as well as alloys of the precipitation type makes this metal ideally suited as a basis for fundamental studies of the deformation process. Moreover, considerable interest in the behavior of aluminum alloys at elevated temperatures has been stimulated both by the needs of the

[1]For further technical details, see Creep of high-purity aluminum by Wm. D. Jenkins, NBS J. Research *46* (April 1951) RP 2201.


REELS

WOOD REELS
FOR
CABLE, ROPE
AND WIRE

PLUS A SPEEDY SHIPPING SERVICE

If your mill is located within 200 miles of Hazardville, BRIDGE trucks will deliver reels to your door — overnight, if necessary.

For points beyond carload shipments out of Springfield, Mass., can be in St. Louis, for instance, in three days. L.C.L. shipments to points like Buffalo and Cleveland will arrive the second morning and be delivered to your door *at no extra cost.*

BRIDGE REELS are made in RETURNABLE and NON-RETURNABLE types in sizes from 12" to 96" in diameter. Furnished knocked down or assembled for SHIPPING or SHOP use. Also, REEL HEADS for STEEL DRUMS.

You are invited to avail yourself of our unique service. Visit our plant and see how BRIDGE'S REELS are made and why they are as sturdy and low in cost. . . . . .

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HAZARDVILLE, CONN.
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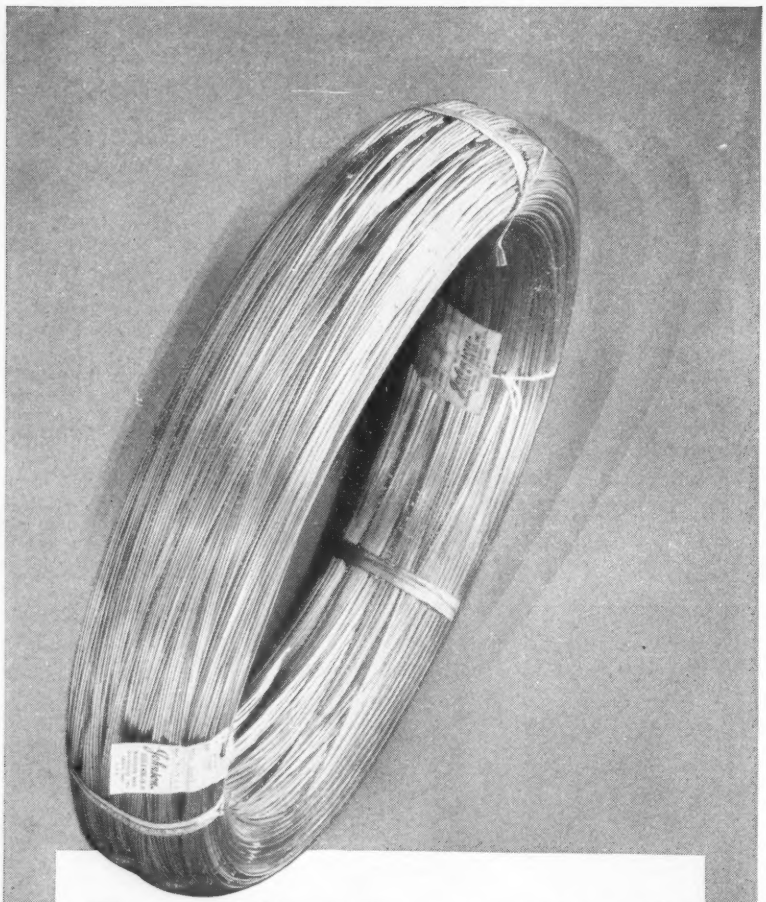

*For specialty wires—a specialty mill*

Wires as fine as .003" made to meet your exacting specifications by Johnson specialists, quality producers of:

MUSIC SPRING WIRE.
AIRCRAFT CABLE WIRE.
BRUSH WIRE FOR HAND AND POWER BRUSHES.
HOSE REINFORCEMENT WIRE (BRAIDED TYPE).
VACUUM HOSE WIRE.
FLAT AND HALF OVAL SPECIAL SPRING WIRE.
OIL TEMPERED SPRING WIRE.
HARD DRAWN SPRING WIRE.
HIGH CARBON ROPE WIRE.
HIGH TENSILE GALVANIZED STEEL WIRE.

Bright drawn, tinned, galvanized, liquor finish, copper coated, bronze plated, alloy coated.

*Johnson sets the standard of the industry*

JOHNSON

STEEL AND WIRE COMPANY, INC.
WORCESTER 1, MASS.

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Atlanta Houston Tulsa Los Angeles Toronto

aircraft industry and by the availability of aluminum and its alloys in a fairly pure state. The Bureau's study included the standard creep tests made in tension at 105°F under constant load conditions. These results were supplemented by data from interrupted tensile tests at room temperature and from other creep tests in which the test temperature was changed from 105° to 95° and back to 105°F.

★ ★ ★

**The** extension-time curves for the constant load tests conformed generally to the well-known patterns associated with creep; an initial extension upon application of load, a stage of decreasing rate of extension, a stage of minimum rate of extension, and a stage of increasing rate eventually leading to complete fracture. However, as was observed in previous investigations[2] of ingot iron and copper at the Bureau, the rate of change of extension with time in these tests also occurred in a discontinuous manner. The frequency and amplitude of the cycles produced are attributed to the magnitude of the stress and the thermal-mechanical history of the material. Discontinuous flow was also revealed at room temperature by serrated stress-strain curves.

★ ★ ★

**A linear** relationship between tensile creep stress and second stage creep rate was not found in the Bureau's investigation. Rather, a sigmoidal curve was produced when these values were plotted on either a log-log or semilog basis. Extrapolations based on a linear relationship could therefore result in serious difficulties.

★ ★ ★

**Several** types of recovery (grain softening) were revealed by the different tests conducted during this investigation of high-purity aluminum. One type was manifested by an increase in extension at the beginning of the third stage (the region after which the average creep rate continuously increases) for a specimen tested under constant load

[2]Creep of annealed high-purity copper, NBS Tech. News Bulletin *34*, 130 (1950), NBS J. Research *45*, 153 (1950) RP 2121; creep of ingot iron, NBS Tech. News Bulletin *34*, 34 (March 1950), NBS J. Research *43*, 117 (1949) RP 2013.

at 105° and 95°, then at 105°F. Another type of recovery was illustrated by interrupted tensile tests in which the specimen was deformed to a predetermined strain, followed by dropping the load to zero. The tensile test was then continued to a higher strain value and the above process was repeated. Lowering of yield stress as a measure of recovery was evidenced in all the latter cases.

★ ★ ★

**Structural** features accompanying plastic deformation indicated that the self-recovery process occurring within the individual grains was continuously changing throughout each test. Deformation in different grains was characterized by a difference in the magnitude and distribution of subcrystals and strain markings. Specimens strained at relatively fast rates showed a tendency to fracture in a transcrystalline manner. The cracks that eventually link up to form the main fracture course are initiated in the vicinity of the axis and propagate to the surface. In this way a "rim" is formed whose diameter decreases with increase in strain for any one particular specimen. Increases in creep rate tend to accentuate the formation of the rim.

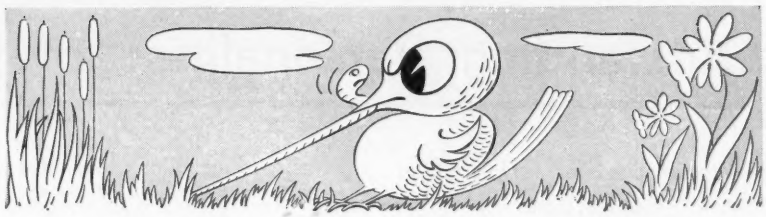
★ ★ ★

### Metal Cleaner Booklet

**Four** Cowles Metal Cleaners are discussed in a new booklet, "Heavy Duty Cleaning—The Fast Way", just released by **Cowles Chemical Company**, 7016 Euclid Avenue, Cleveland 3, Ohio.

★ ★ ★

**The booklet** was especially designed to explain how and why operating time can be cut and cleaner costs lowered when Cowles HD-N Cleaner is used in heavy duty metal cleaning. It points out types of soil removed and the physical and chemical methods used in their removal. HD-N is discussed fully, along with Cowles LP Cleaner for removing buffing and drawing compounds, Cowles SK Cleaner for oil, fat and grease removal and Cowles LIXOL Cleaner for use in pressure-spray washers. Please write to Cowles for your copy of this booklet.

**For the best**

*spring*

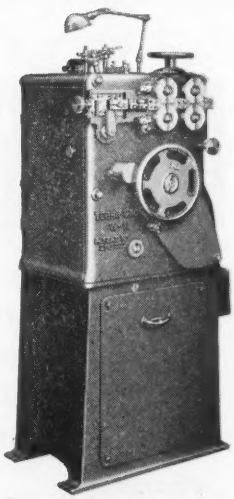
**every**

*time*

**see the man with a**

**Versatile Torrington Spring Coiler**

In spring coiling, the words "Torrington" and "Versatile" are synonymous! When you desire springs produced to meet exacting requirements, just call the professional springmaker who has a Torrington coiler. He's the man who can fill your needs with accuracy, speed and economy. On special springs, our sales department will gladly assist you in finding a source of supply, or help your springmaker devise just the right tooling to produce it.



MODEL W-11 SPRING COILER
The 14 different Torrington Spring Coilers cover a range of wire diameters from .003" to .750".

**SPECIFICATIONS**
**of the Model W-11 Spring Coiler**

Wire diameter range: .015" to .072"

Wire Length per Spring: 0" to 42" (Extra Wire Feed Gears Available)

Coil Range (O.D.): 3/32" to 1-9/16"

Production: 23 to 190 springs per minute with variable speed drive.

Torsion and other attachments are available.

The TORRINGTON MANUFACTURING COMPANY
TORRINGTON, CONNECTICUT

# Outstanding Personalities of the Wire Industry

## Walton Sommer Advanced by Keystone

**R. E. Sommer,** president and general manager of the **Keystone Steel & Wire Company,** recently announced the appointment of **Walton B. Sommer** as assistant to the president. His duties are to obtain additional sources of supply for materials and equipment critically needed to maintain current operations and planned expansions of Keystone and its affiliated companies.

★ ★ ★

**Walton B. Sommer** has been associated with the steel industry for more than ten years. While attending Bradley College, he worked in the Keystone office and plants during vacation. In 1941, he joined the National Lock Co., a Keystone subsidiary at Rockford, Illinois, where he progressed through manufacturing and sales to manager of the lock sales department. The years 1943-1945 saw him represent the Firth-Sterling Steel Co. as a sales engineer in the Chicago district. After Mr. Sommer's return to National Lock Co. in 1945, he was advanced to Sales Manager of the Screw and Bolt Division. Last fall he was elected vice president of that company, and in January of this year, member of the Board of Directors. Mr. Sommer also serves as a director for another Keystone subsidiary. The Wire Specialties Company, San Jose, California.

Walton Sommer, Assistant to the President, Keystone Steel & Wire Co., Peoria, Ill. *

★ ★ ★

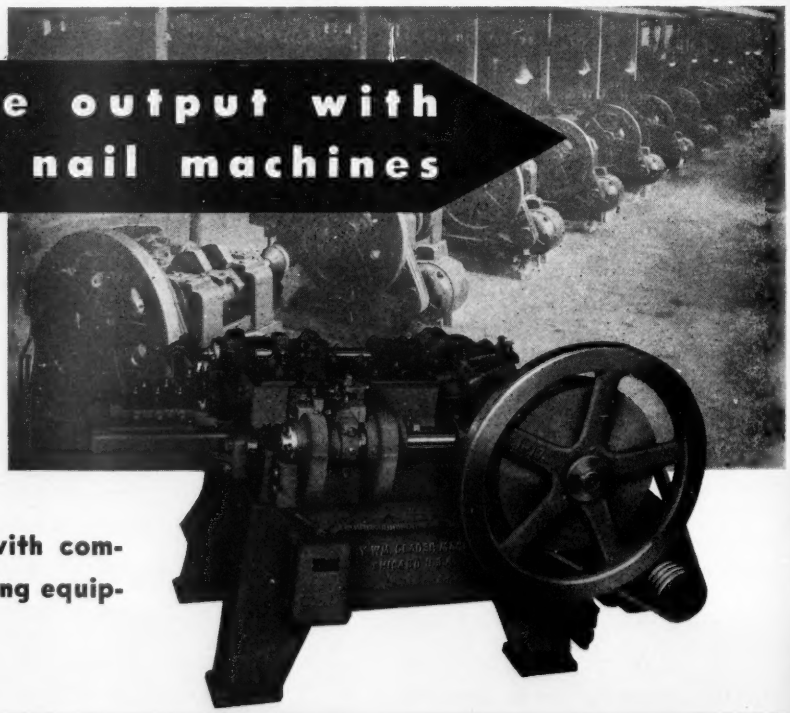
**Mr. Sommer** is one of the fourth generation of Sommers in the Keystone management.

★ ★ ★

## O'Brien Leaves Wire Industry

**J. E. O'Brien,** formerly Metallurgical Supervisor for the **Wire Rope Division of the Bethlehem Steel Company** at Williamsport, Pa., resigned his position there and has acquired an interest in the **Globe Paint Works, Inc.,** of the same city. He is secretary and treasurer of that corporation.


high tonnage output with GLADER wire nail machines



A size and type machine available to make everything from tacks and brads to 12" spikes with maximum efficiency.

Write for 12 page bulletin with complete information on nail making equipment.

WM. GLADER MACHINE WORKS 210 N. RACINE AVENUE CHICAGO 7, ILLINOIS

Export Dept.: 122 E. 42nd Street, New York 17, N. Y.

### Manager for Painesville Plant Appointed

**Appointment** of **Dr. F. Dudley Chittenden** as factory manager of the Marvinol vinyl resin plant at Painesville, Ohio, was announced recently by **John C. H. Wendes**, production manager of the **Naugatuck chemical division, United States Rubber Company.**

★ ★ ★

**Formerly** development manager of the Naugatuck chemical division, Dr. Chittenden has had a long and outstanding career in rubber chemistry.

★ ★ ★

**He joined** U. S. Rubber Co. in 1926 as a chemist in the company's general laboratories. For the next sixteen years he worked in various capacities connected with chemical research and development, both in the general laboratories and in the company's Providence, R. I. plant.

★ ★ ★

**In 1942** he was transferred to the synthetic rubber division and played an important part in the initial development of man-made rubber. In 1943 he was named chief chemist of the Institute, W. Va. synthetic rubber plant operated by Naugatuck Chemical for the U. S. government, and in 1945 he was named factory manager of the synthetic rubber plant in Naugatuck, Conn. He became development manager of the Naugatuck chemical division in 1947.

★ ★ ★

**At the same** time the Company advanced **Dr. Harry Wintsch** to the post of assistant production manager of the division. He has been with U. S. Rubber for 23 years.

★ ★ ★

### E. F. Houghton Appointments

**E. F. Houghton & Co.**, makers of oils, metal working products, mechanical leathers, Philadelphia, announces the appointment of **Carlos H. Mercado** as Manager, Foreign Sales Department, succeeding L. J. Norris, who has retired because of ill health.

★ ★ ★

**Mr. Mercado** was formerly with Mercher Trading Corporation, New York for whom he was Export Manager and Treasurer. Born in the Dominican Republic, he was educated at Temple University, Philadelphia and College of the City of New York.

★ ★ ★

**Announcement** is also made of the election of **William F. MacDonald** as President of **E. F. Houghton & Co. of Canada, Ltd.**, succeeding the late G. W. Pressell. **E. H. MacInnis** continues as Vice President and Sales Manager, with headquarters at 100 Symes St., Toronto.

★ ★ ★

### To Represent Atlas Mineral Products

**Shutt Process Equipment Company**, operated by **George T. Shutt**, has just been appointed agents for **Atlas Mineral Products Company** for Chemical Resistant Materials of Construction in the St. Louis Territory. Mr. Shutt is a graduate of Washington University with a degree in chemical engineering. He is a veteran of World War II and has been associated with the Aluminum Ore Company, St. Louis, Mo. in the Purchasing Department for a number of years.


# DAVIS EQUIPMENT . . .

## FOR ELECTRIC WIRE MANUFACTURE

AUTOMATIC SPARK TESTER — For the accurate location of dielectric faults in insulating wire coating. Used in continuous line with plastic extruders or curing equipment. Voltage range of 3,000 to 16,000 volts.

CAPSTAN — Motor-driven, variable speed, for use with high-speed plastic extruders. Standard speeds of 100 to 1500 r.p.m. Higher speed gearing can be provided.

PAY-OFF STAND — Controls tension at wire and brakes automatically and smoothly.

TAKE-UP STAND — Automatically stops when dielectric faults are indicated by the SPARKER. Designed particularly for use with high-speed plastic covering machines.

AUTOMATIC RE-SPOOLER—Layer winds parallel cords. Has motor driven traverse with adjusting stops. Good not only for insulated wire, but for bare wire.

DAVIS EQUIPMENT IS RUGGED AND RELIABLE

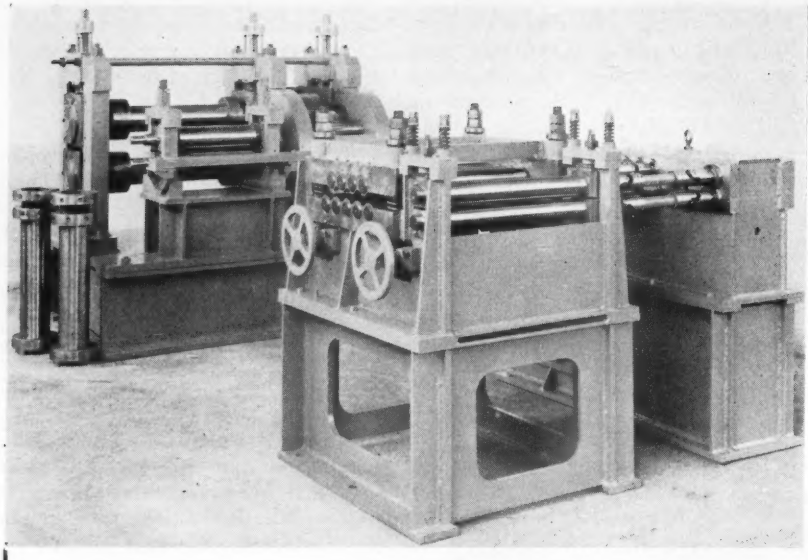
Design for continuous, fast, precision operation.

*Write us today for detailed information!*

DAVIS EQUIPMENT

THE R. L. DAVIS ELECTRIC CO., INC. • WALLINGFORD, CONN.

SPARK TESTERS • SPOOLERS • TAKE-UPS • CAPSTANS



# SPECIAL MACHINERY BUILT

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"American" INSULATING MACHINERY COMPANY

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PHILADELPHIA PENNSYLVANIA U.S.A.

**WIRE ANNEALING, TINNING and GALVANIZING OUTFITS**
**MULTIPLE or SINGLE UNIT WIRE TAKE-UPS**
**FINE WIRE DRAWING MACHINES**
**MAGNET WIRE ENAMELING EQUIPMENT, INCLUDING**
**PRE-ANNEALERS, SYNTHETIC ENAMEL APPLICATORS**
**and CIRCULATING SYSTEMS**
**COTTON, GLASS-FIBER and TAPE COVERING MACHINES**

# LUNDAHL CARBIDES

***Graded to Meet Your Requirements***

**FOR SLEEPER AND HARTLEY, TORRINGTON, AND OTHER SPRING MAKING MACHINES**

COILING POINTS

ARBORS

BLOCK GUIDES

Let the Lundahl Engineering Department specify the correct grade of carbide tools to provide greatest performance on your spring making machines. Illustrated here are a few Lundahl carbide tools. Made in three grades.

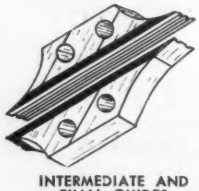
1. **STANDARD GRADE** Excellent wearing qualities with satisfactory toughness.
2. **INTERMEDIATE GRADE** Greater wear life — slightly less toughness.
3. **MAXIMUM GRADE** The hardest practical with the best wear life. Other grades available.

***Write for literature and our recommendations on the correct carbide for your particular needs. No obligation.***

## LUNDAHL CORPORATION

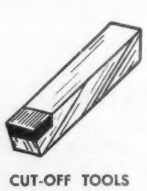
Specialists in Tooling for Spring Makers

**1429 PARK STREET, HARTFORD 6, CONN.**



INTERMEDIATE AND FINAL GUIDES

PITCH TOOLS



CUT-OFF TOOLS

TORSION COILING POINTS

TORSION ARBORS

FEED ROLLS

### Rome Cable Adding New Plant For Defense Contracts

**The Rome Cable Corporation** announced it has received a government contract calling for production of special communication wire.

★ ★ ★

**The** contract necessitates the construction of a new factory and the employment of an additional 500 workers.

★ ★ ★

**A. D. Ross Frazer,** president, said construction of the factory will start shortly and wire production is expected to get under way in the Spring. The new building will have about 120,000 square feet of floor space, and will be built of brick, steel and cncrete.

### Witherspoon Made Assistant To General Superintendent at Donora

**J. C. Witherspoon,** named assistant to general superintendent of the Donora Steel & Wire Works, of the American Steel & Wire Co.

### Changes in Norton Sales Offices

**Robert D. Lawson** became sales manager of **Norton Company's** grinding machine division on May 1, according to an announcement by vice president **Frank W. Smith.**

★ ★ ★

**Mr. Lawson,** Chicago district manager for the company's grinding machine division since 1946, will replace **C. Denson Day,** who has resigned to accept a position as vice president with Machinery Associates, Inc. of Philadelphia, Pa. Mr. Day had been with Norton Company since 1926.

★ ★ ★

**Wilfred R. Ogg** will take over the Chicago District Managership on April 16, at 4737 So. Christiana Ave., Chicago, Illinois. He is presently the New England sales representative for Norton grinding machines.

★ ★ ★

**Louis J. Camarra** of the Foreign Division has been assigned to handle the Northern New England territory starting April 2.

★ ★ ★

### Louis C. M. Reed

**Louis C. M. Reed,** President of Reed & Richards Transatlantic Inc., 122 East 42nd Street, died on March 26, 1951 in New York City.

★ ★ ★

**Mr. Reed** had been in the export business throughout the world for some 50 years and had spent long periods of residence in England, France, Australia and India. He had organized the Field Divisions of the Chamber of Commerce of the United States. He had served two terms as president of the Circumnavigators Club and had retired as president of the Adventurers' Club in November 1949.

★ ★ ★

**At his** death the firm handled the export sales of the Glader line of Nail Machines and Barb Wire Machines and exported also the staple manufacturing machines of the Humphrey & Sons Co. and the Bale Tie Machines of W. C. Downey & Co. The business of Reed & Richards Transatlantic will continue with the same lines under the presidency of his successor, Mr. G. H. Seybold.


**Add up these HOUGHTO-DRAW benefits**

*and you'll never again use Lime*

*in* **BAR DRAWING!**

**Cleaner . .** Houghto-Draw is cleaner, easier to handle compared with messy lime coatings.

**Faster . .** Takes less time to bring Houghto-Draw solution to proper working temperature.

**Simpler . .** Ordinary cleaning processes remove Houghto-Draw's thin film coating from work.

**Stronger . .** Rupture-proof Houghto-Draw adheres to metal under severest pressures.

**Safer . .** Lubricates with "controlled friction" to provide non-welding, chatter-free drawing.

**Better Results!** Unlike lime, Houghto-Draw Dry Film Compound keeps bar surface smooth and bright. Adds extra salability. Helps you improve bar quality and increase output as well.

*Get Complete Information on*

**HOUGHTO-DRAW DRY FILM DRAWING COMPOUND**

*. . . a product of*

E. F. HOUGHTON & CO.

PHILADELPHIA · CHICAGO · DETROIT · SAN FRANCISCO

*Ready to give you on-the-job service . . .*

## La Société des Anciens Etablissements
## POURTIER FRÈRES

**Fondée en 1860**

**Manufacturers of Telephone and Electric Cable Machinery**

**153-155 Rue du General Galliéni, ROMAINVILLE (Seine), FRANCE,**

**are exhibiting a**

# POURTIER INSULATION WINDING and TAPING MACHINE

**IM 402**

**for cotton, paper, fiberglas, asbestos and varnished cambric at**

## 5426 Tonnelle Ave., NORTH BERGEN, N. J. • Tel. Union 6-0918

**Their Engineer, M. Daniel POURTIER, is at your disposal from May 10th to May 30th for demonstration.**

***Please write or phone for appointment.***

# the ROYLE SPIROD* EXTRUDER

A completely new and different concept of electrically heated extruder designed for plastics materials. . . . Higher operating temperatures. . . . Lower operating costs. . . . Radiant heated. . . . Zoned as required throughout cylinder and head. . . . Even and controlled cooling. Royle Spirod Extruders have been field-tested and their stamina proved. Check these features that assure trouble-free operation —positive results.

- Heavy steel members without flanges
- Spirally installed rod type heating elements provide faster and more even distribution of heat
- Radiant heat provides steadier temperatures
- Complete insulation reduces heat loss with substantial power savings
- High watt capacity heating elements provide faster heat at lower cost
- Long life heating elements provide high and sustained operating temperatures
- Separate heating zones controlled by proportioning instruments
- Simple installation should replacements become necessary

*Patent Applied For

## JOHN ROYLE & SONS

ROYLE PATERSON N. J. 1880

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### R. T. Eakin Named Manager Of Allegheny Ludlum Steel Brackenridge Plant

**Robert T. Eakin,** metallurgical engineer who joined Allegheny Ludlum Steel Corporation in 1940, has been appointed manager of the Brackenridge, Pa., plant succeeding George Evans, who becomes special consultant to the vice president in charge of operations.

★ ★ ★

**Mr. Eakin,** a native of Franklin Pa., became a student trainee in June 1940, after receiving his degree from Penn State. After completing his training, he was assigned to the company's Dunkirk, N. Y., plant as a metallurgical observer where his work resulted in his being named chief metallurgist of a bullet core plant the company built and operated for the Government at Dunkirk during World War II.

★ ★ ★

**In 1944,** Mr. Eakin was made manager of the carbide alloys plant at Ferndale (Detroit), Mich. His work there in developing tungsten carbide bits for mechanical coal miners was so outstanding that he became the youngest employe ever to win the Allegheny Ludlum Achievement Award.

★ ★ ★

Mr. Eakin was transferred to the Brackenridge plant in 1950 to work out improvements in metallurgical control in melting practices. Shortly thereafter, he was named assistant plant manager.

★ ★ ★

**The Brackenridge** plant, employing approximately 7,000 workers, is the largest of ten plants operated by the company and its subsidiaries. Schedules call for installation of new facilities by the end of 1952 at an estimated cost of about $20,000,000. These installations, mostly of facilities for production of high alloy and wide strip, are a part of the company's 1950-52 $30,000,000 plant improvement and expansion program.

★ ★ ★

### John G. Patten Appointment

**John G. Patten,** has been appointed assistant general traffic manager for KAISER ALUMINUM & CHEMICAL CORP., with headquarters in Oakland, Calif.

### McKnight Advanced by Chain Belt

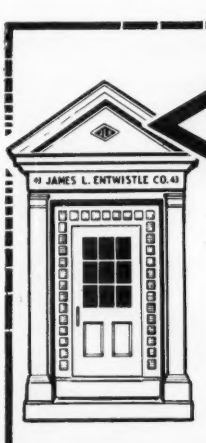
**Chain Belt Company** of Milwaukee announces the election of **L. B. McKnight** to the newly created position of Executive Vice President of the Company.

★ ★ ★

**Mr. McKnight** has served in various managerial capacities since joining the Company in 1927 and has been a Vice President and Director since 1948. He is currently President of the National Association of Conveyor Equipment Manufacturers and is also a member of the Conveyor Industry Advisory Committee to the National Production Authority.

★ ★ ★

**The Chain Belt Company** operates plants in Milwaukee and West Milwaukee, Wis., and Springfield and Worcester, Mass., with executive headquarters in Milwaukee.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- Standard Sets of Spark-Testing Equipment
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- Coilers
- Spoolers
- Collapsible Coiling Reels
- Wire Sparkers and Accessories
- Hand Locators
- Electrode Units and Stands
- Measuring Machines, Counters and Accessories
- Wire Guide Units
- Pay-off Reels Stands
- Electronic Devices
- Conduit Connection Sets
- Wire Pre-Heater
- Disk Brakes and Controls, Drag Units and Slip Clutches
- Wire Marking Machines, Type Strips, Inks
- Labelling Machines
- Pneumatic Equipment and Controls
- Miscellaneous Equipment
- Hydraulic Equipment and Controls
- Hi-Pot Test Sets
- Cable Handling Equipment for Warehouse Use

See Page 384 For News of the JLE Wire Sparkers

JAMES L. ENTWISTLE CO.

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## Reynolds Metals Publishes Book on "Mechanical Fastening Methods for Aluminum"

**Latest addition** to the group of technical books published by Reynolds Metals Company is "Mechanical Fastening Methods for Aluminum." Here are 136 pages of information on the many different ways for mechanically joining aluminum parts, including the use of metal stitching, resin bonding and ingenious mechanically formed joints. Other joints are made with rivets, screw fasteners, nails, or pins . . . all are described in detail, their applications analyzed and advantages pointed out.

★ ★ ★

**Unlike** welding, brazing and soldering, which are limited to the production of metal-to-metal joints, mechanical fastening methods are suitable not only for joining aluminum to aluminum, but aluminum to wood, plastics, fabrics and other non-metallics. However, there has been little published information available on these important fabrication processes and it is to answer this need that this book has been written.

**The book** is divided into eight main sections. These are devoted to (1) standard rivets, (2) special rivets, (3) standard screw fasteners, (4) special screw fasteners, (5) nails and pins, (6) metal stitching, (7) mechanically formed joints, and (8) resin bonding.

★ ★ ★

**There** are 17 tables of related data, including dimensions and number of pieces per pound for six different types of standard rivets, lengths of rivets for cone-point and button type driven heads, recommended hole sizes with shear and bearing areas for both hot and cold-driven rivets, and maximum loads for single rivet in shear.

★ ★ ★

**The book** was written by **F. F. Dietsch**, Specifications Engineer, Products & Applications, **Reynolds Metals Company.** It was edited and produced by **G. W. Birdsall,** Manager, Technical Editorial Service, Reynolds Metals Company. Address Reynolds Metals Company, 2500 South Third Street, Louisville 1, Kentucky.

★ ★ ★

**This** 6 x 9-inch pocket-size book is wire-bound to lie flat when opened. It will be sent without charge to engineers, designers, production men and executives in the metalworking industry who request it on company letterhead.

★ ★ ★

## Rex to Make "Nonstrip" Wire

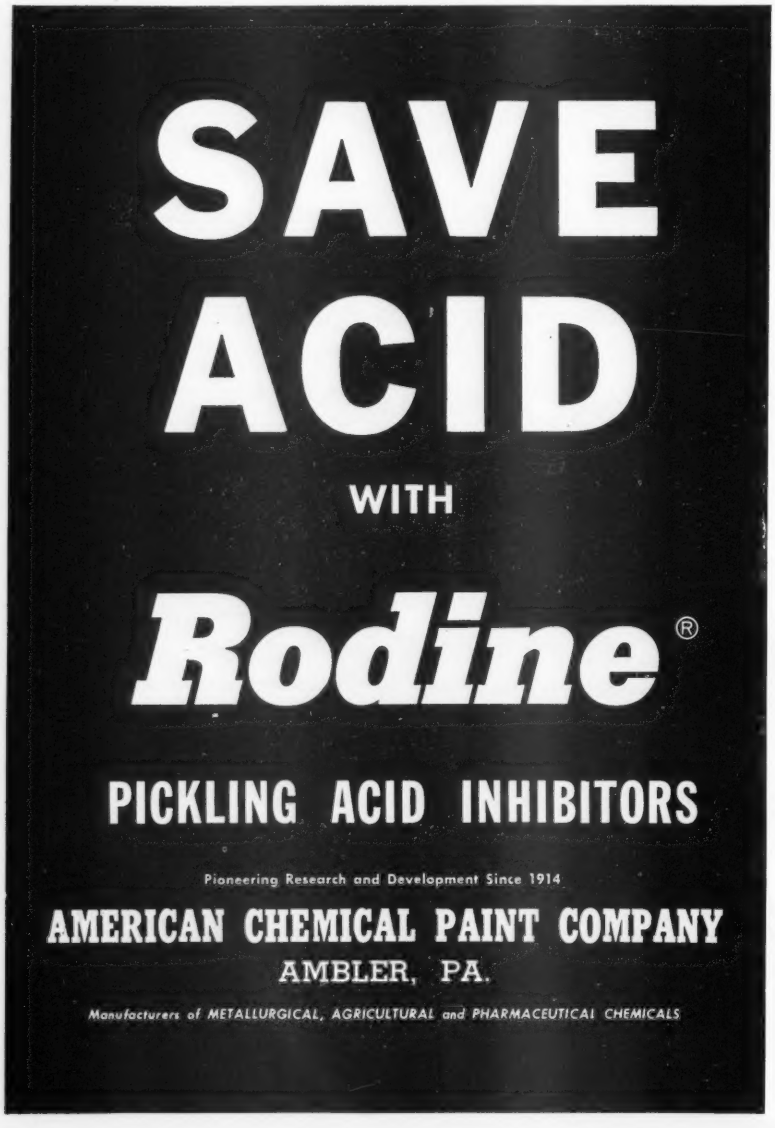
**The Rex Corporation** is pleased to announce that it has assumed all production, sales and development responsibilities for Product Development Company's "Prodelin" "Nonstrip" wire. The product shall henceforth be known as "Nonstrip".

★ ★ ★

**Product** Development Company has turned over to Rex all equipment and processes necessary for the production of "Nonstrip". It is the plan of the Rex Corporation to expand these facilities so that increased production will result in better service to present customers and permit the acceptance of new customers.

★ ★ ★

**Peter R. McClure** has been appointed Technical Sales Engineer for Rex "Nonstrip" and will be in charge of all phases of the operation.



## New Clutch Coupling Features Vertical-Lift

**A new** type Rawson Centrifugal Clutch Coupling for use with heavy equipment is announced by its designer and manufacturer, **Centric Clutch Company**, 22 South Avenue, West, Cranford, New Jersey. This unit was constructed to permit "Vertical-Lift" from the mounting of either driver or driven equipment without disturbing either member, whenever moving heavy equipment is a problem.

★ ★ ★

**Most** dual drives to pumps, fans, generators, etc., are good applications because the equipment is generally mounted in concrete and is unusually heavy. Then too, space restrictions often make telescoping of coupling for assembling and dis-assembling extremely difficult or impossible. The "Vertical-Lift" Rawson is, therefore, practical for such needs and applications. It simplifies maintenance of equipment, reducing shut-down time to a minimum.

★ ★ ★

**This** is how the Rawson works. The driving spider slides back over the driving hub far enough to clear the driven half of the coupling, thus permitting either member to be lifted clear of the other. It is important to note that the action of the Rawson Clutch Coupling Type AVL is not affected in any way by the "Vertical-Lift" feature.

★ ★ ★

**For** those who are interested, Centric Clutch Company will furnish rating and selection tables of proper sizes to meet specific needs.

★ ★ ★

## New Aluminum Alloy Rivet Developed by Alcoa

**A new** aluminum alloy rivet in the large size range, stronger than any heretofore available, has been developed by Aluminum Company of America and is now offered on an experimental basis for use with heavy duty aluminum structures. The new rivet alloy has been temporarily designated as "XB77S". Rivets of this material can be hot driven by hand pneumatic hammers.

★ ★ ★

**The following** characteristics are provided: an average shear strength of 38,000 psi within two weeks after driving, a wide temperature range for driving, and good resistance to corrosion when used in recommended applications.

★ ★ ★

**The rivets** are available in the ½, ⅝, ¾, ⅞ and 1 inch sizes. When heated within the required temperature range, it is possible to drive each of the above sizes, except the 1 inch, with the proper hand operated pneumatic hammer. When the rivets are squeeze driven, the size range can be extended to include the 1 inch rivet.

★ ★ ★

## New Bulletin on Alodine

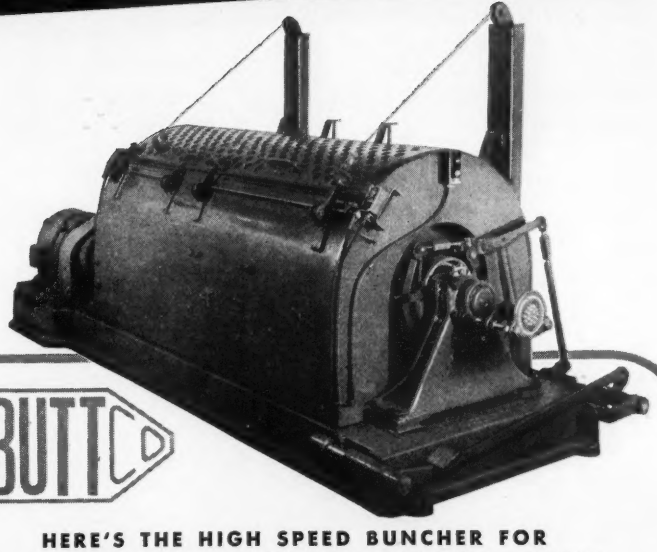
**American Chemical Paint Co.**, Ambler, Pa., have issued a new bulletin on the economical and efficient method of protecting and preparing surfaces for bonding paint to aluminum by the "Alodozing" process.

★ ★ ★

**Surfaces** may be treated by immersion, brushing or spraying in a multi-stage power washer. The bulletin gives complete details for the use of Alodine and will be sent without charge upon request.

★ ★ ★


Give your Production a New Twist!



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HERE'S THE HIGH SPEED BUNCHER FOR FAST, ECONOMICAL TWISTING OF SMALL WIRES

Check these big features:

- ☐ Two twists produced at each revolution
- ☐ Accommodates standard shop reels up to 24" dia. x 12¼" O.A. width
- ☐ Double drum grooved capstans
- ☐ Quick acting electrically operated brakes
- ☐ Push button control station
- ☐ Substantial guards and safety features
- ☐ Anti-friction bearings
- ☐ Rugged construction with low center of gravity

Butt High Speed Bunchers are made in two sizes: S-31 for strands up to No. 14; S-35 for strands up to No. 8. *For further details write for Circular No. 63.*

NEW ENGLAND BUTT COMPANY

1842

206 PEARL STREET • PROVIDENCE 1, R. I., U. S. A.

## New Type Annealing Spider

**A revolutionary** new type Annealing Spider has just been announced by **KIF Industrial Fabricators,** North Haven, Conn. As contrasted to conventional cross-member construction, a large central pipe, with eight smaller pipes welded to its perimeter, holds the wire coils round with only a line contact. This construction affects an equal distribution of heating and cooling forces which prevents warping during the annealing process. Designed to minimize warping, give longer life and reduce loading and stripping friction in wire annealing, the new KIF Annealing Spider has many meritorious mechanical, construction and operating features.

★ ★ ★

**With** an overall height of 81 inches, any diameter can be furnished to meet individual needs within a range of 10 to 30 inches. It can be furnished with either solid or removable bottom plates to suit any stripping method.

★ ★ ★

**The manufacturer** claims that the KIF Annealing Spider eliminates the costly discarding of spiders because of being badly warped out of shape or because they are impossible to load or strip. It is also claimed that the KIF Annealing Spider prevents damage to wire during the annealing operation and minimizes lost production time due to damaged wire.

KIF Annealing Spider

★ ★ ★

**Further** information can be secured from KIF Industrial Fabricators, Devine St., North Haven, Conn. Or send them your coil sizes and other pertinent specifications to quote on a spider to fit your specific requirements.

★ ★ ★

### THE OCTOBER CONVENTION ISSUE

Your advertising in the October issue of WIRE AND WIRE PRODUCTS is a must. This important number of the magazine carries preprints of technical papers to be presented at the Annual Wire Association Convention and other convention features. Due to its long life and high reference qualities your advertising in October has exceptionally high value. Make your plans now to be represented in this very special issue.

★ ★ ★


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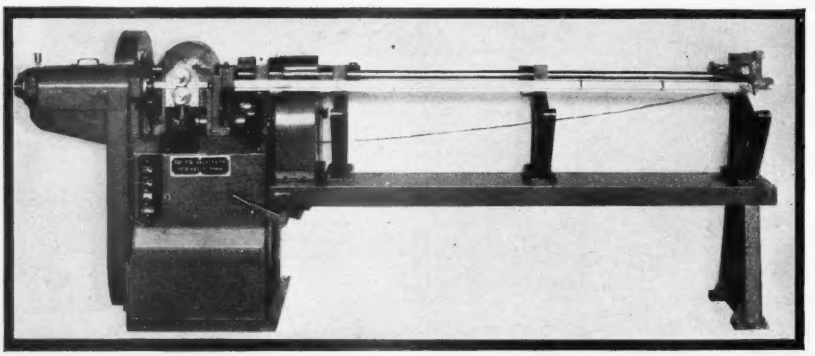

CAP. 1/16 TO 3/16" DIA.

**STRAIGHTENER SPECIALISTS FOR OVER 80 YEARS**

*Here are some of the refinements developed:*

ALMOST CONTINUOUS WIRE TRAVEL—A LIGHTENING CUT-OFF THAT ASSURES SQUARE ENDS—A HIGH-SPEED, DIRECT-DRIVEN 5-DIE STRAIGHTENING FLIER—QUIET, EFFICIENT V-BELT MOTOR DRIVE—BALL & ROLLER BEARINGS THRUOUT—EXTREME RIGIDITY—TYPES FOR CAPACITIES FROM .025" to 11/16" DIAMETER

*Descriptive Folder Sent on Request*

**Mfd. by METTLER MACHINE TOOL, INC., 132 W. Lawrence St., New Haven, Conn.**

**SHUSTER** *Automatic* *Since 1866* WIRE STRAIGHTENING AND CUTTING MACHINES

# A Review of Recent Wire Patents

No. 2,544,233, NONMETALLIC SHEATHED MULTICONDUCTOR CABLE, patented March 6, 1951 by Frank J. Kennedy, Mount Lebanon, Pa., assignor to National Electric Products Corporation, Pittsburgh, Pa., a corporation of Delaware.

The conductor wires are sheathed in vulcanized high-polymer elastomeric material with a filler block of vulcanized high-polymer elastomeric material positioning the sheathed conductor wires in mutually spaced relation, the sheaths being mutually non-adherent, a stranded fibrous covering is positioned around the inner assembly of sheathed conductor wires and filler block having, between strands thereof, interstices through which the substance of the filler block projects, and outwardly of all is a jacket of high-polymer elastomeric material surrounding this stranded fibrous covering and having a vulcanized bond with the substance of the filler block projectant through the interstices of the stranded covering.

★ ★ ★

No. 2,544,401, WIRE REEL, patented March 6, 1951 by Sherman D. Spurling, Macon, Ga.

The reel has a fixed side housing part and a swingable side housing part with the spool therebetween adapted to be varied in circumference so as to take care of wire of different internal diameters.

★ ★ ★

No. 2 544,670, METHOD OF FORMING COMPOSITE ALUMINUM-STEEL PARTS BY CASTING ALUMINUM ONTO STEEL AND BONDING THERETO, patented March 13, 1951 by Howard L Grange and Dean K. Hanink, Detroit, Mich., assignors to General Motors Corporation, Detroit, Mich., a corporation of Delaware.

There are 10 claims to this method.

★ ★ ★

No. 2 544,671, METHOD OF FORMING COMPOSITE PRODUCTS CONSISTING OF FERROUS METAL AND ALUMINUM OR ALUMINUM-BASE ALLOY, patented March 13, 1951 by Howard L. Grange and Dean K. Hanink, Detroit, Mich., assignors to General Motors Corporation, Detroit, Mich., a corporation of Delaware.

The aluminum alloy contains at least 80% aluminum. There are 8 claims.

★ ★ ★

No. 2 544,838, WIRE NETTING MACHINE, patented March 13, 1951 by Harry L. Kitselman, Muncie, Ind., assignor to Indiana Steel and Wire Company, Muncie, Ind., a corporation of Indiana.

The assembly includes an endless series of spaced, parallel rows of slotted twister gears on a movable support, devices for feeding two sets of mesh wires, a wire-forming mechanism associated with each set of mesh wires and operating in timed relation with the twister-gear support, each mechanism operating to form in each of its associated wires a series of lateral off-sets, guides for guiding both sets of formed mesh wires into association with the support at spaced points thereon, devices at each of such points for forcing formed mesh wires into the slots of the twister gears, and mechanism operable in the movement of support for rotating the gears of each row after the preformed mesh wires have been deposited in the slots thereof.

★ ★ ★

No. 2,545,066, MEANS FOR COATING FILAMENTS, patented March 13, 1951 by Albert Olen Ryan, Independence, Ky., assignor to Redding Manufacturing Company, Inc., Norwalk, Conn., a corporation of Delaware.

Provision is made for flowing two liquids around the filament and through a tube, the flow rates being controlled so that the liquids flow through the tube with a viscous flow.

★ ★ ★

No. 2,545,079, WIRE DISPENSER, patented March 13, 1951 by Ted Goddard, Los Angeles, Calif.

A semi-circular frame supports the wire coil.

★ ★ ★

No. 2,545,137. CORROSION INHIBITORS patented March 13, 1951 by Werner David, Battersea, London, England, assignor to Shell Development Company, San Francisco, Calif., a corporation of Delaware.

**Complete Description and Drawings of Patents May Be Had for 50 cents, outside the United States and Canada $1.00. Address, Wire & Wire Products, 300 Main St., Stamford, Conn.**


The Specialists in Wire-Straightening and Wire-Cutting!

Diameter Range 1/16" to .005"

Our motto...Precision

Wire men everywhere concede that nobody in the world can match our precision straightening and cutting. This reputation springs from almost two decades of flawless workmanship for the automobile, aircraft, radio, television, communications, toy and textile industries.

Length tolerances in the ten thousandths of an inch are routine here. Wire ends show no burrs. Every day, tons of soft and hard wire are cut anywhere from fractions of inches up to 20 feet.

Don't hesitate to bring your wire straightening and cutting problems to Pittsburgh Cut Wire Company.

Straightening and Cutting All Types of Wire . . .

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COPPER
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Here the compositions comprise light petroleum hydrocarbons boiling between about 50 to 370° C. 78%; blown rape oil 7.5%; petrolatum 7.5%; na salt of sulfonic acid derived by direct sulfonation of a petroleum fraction containing at least 5% aromatics 2.0% and diacetone alcohol 5.0%, these percentages being by weight.

★ ★ ★

No. 2,545,637, GARMENT HANGER, patented March 20, 1951 by George M. Tibbitts, Santa Ana, Calif.

The hanger is formed of spring wire except for terminal portions engaging the garment.

★ ★ ★

No. 2 545,866, BORON-CONTAINING ALUMINUM WIRE AND METHOD OF ITS PRODUCTION, patented March 20, 1951 by Raymond T. Whitzel and William E. King, Massena, N. Y., assignors to Aluminum Company of America, Pittsburgh, Pa., a corporation of Pennsylvania.

Conductor wire is provided of conductor grade aluminum cold drawn to a diameter of 0.210 inch or less containing from 0.001 to 0.5 per cent boron, this wire being cold drawn from hot rolled rod without any anneal of the wire, the amount of boron being sufficient that the wire will have an electrical conductivity of not less than 61 per cent of that of the International Annealed Copper Standard on a volume basis and an average tensile strength of at least 26,000 p.s.i. for wire drawn to a diameter of 0.210 inch and an increasingly higher strength for wires drawn to smaller diameters.

★ ★ ★

No. 2,546,447, ART OF DRAWING FINE STEEL WIRE, patented March 27, 1951 by Arch W. Harris, Euclid, Ohio, assignor to The American Steel and Wire Company of New Jersey, a corporation of New Jersey.

The method is said to provide a wire consisting entirely of a layer of diffused copper-iron alloy.

★ ★ ★

No. 2,546,451, METHOD OF GALVANIZING, patented March 27, 1951 by Michael C. King, Pittsburgh, Pa., assignor to United States Steel Company, a corporation of New Jersey.

A galvanized ferrous metal body is provided by passing it through a bath of palm oil and then into and through a molten zinc bath, this palm oil bath being disposed a distance above the molten zinc bath and being connected to the zinc bath by a narrow spout-like column of palm oil extending downwardly from the palm oil bath onto the molten zinc bath, the thickness of the column being very little in excess of the thickness of the article passed therethrough.

★ ★ ★

No. 2,546,538, APPARATUS FOR HANDLING AND BRIGHTENING METAL, patented March 27, 1951 by John E. Erhardt, Jr., Baltimore, Md., assignor to Crown Cork & Seal Company, Inc., Baltimore, Md., a corporation of New York.

The apparatus includes a vertically extending furnace structure, a device to move a strip downwardly in a vertical run through the structure, a heater adjacent the lower portion of the structure to heat the strip and an outlet adjacent the upper portion of the structure to flow a cooling liquid upon the run within the structure.

★ ★ ★

No. 2,545,138, CORROSION INHIBITING COMPOSITIONS, patented March 13, 1951 by Werner David, Chester, England, assignor to Shell Development Company, San Francisco, Calif., a corporation of Delaware.

Here the compositions comprise mineral lubricating oil 85 to 95%; sodium salt of petroleum naphthasulfonic acid derived from petroleum naphtha containing from 5 to 10% aromatics, 2 to 5%; blown rape oil 3 to 5% and methyl cyclohexane 5 to 10%; these percentages being by weight.

★ ★ ★

## Bulletin on Heat Exchangers and Pumps

**Nukem Products Corporation,** Buffalo 20, N. Y., has issued a new bulletin on Non-Kast heat exchangers, pumps and floor drains. These are particularly designed for the transfer of corrosive liquids, either hot or cold.

★ ★ ★

**This** equipment is made of cast resins and so designed that no metal is ever in contact with the corrosive solutions. They are light in weight, durable and low in price. Stuffing boxes have been completely eliminated. The transfer range is up to 100 G.P.M. at varying heads. The heat exchangers will raise temperatures 100°Farn. in 2½ hours.

★ ★ ★

**Copies** of this bulletin may be secured upon request.

★ ★ ★

**WIRE SPOOLS, ALL-STEEL, LITHOGRAPHED**

Ends and traverses may be shipped separately and assembled easily in your plant on a hand, foot, or power press.

5" and 6½" diameter ends with 1-15/16" diameter traverses.
10½" diameter ends with 3½" diameter traverses.
Traverse lengths up to 12".

**J. L. CLARK MANUFACTURING CO.**
600 23rd AVENUE • ROCKFORD, ILLINOIS

### "Electroplating"

**A book** for the metallurgist, engineer and chemist—by **J. B. Mohler and H. J. Sedusky,** published by the **Chemical Publishing Co., Inc.,** 212 Fifth Avenue, New York 10, N. Y.

★ ★ ★

**The two** expert authors with long and varied experience in the wide field of electroplating have pooled their knowledge to write a practical book on this important subject especially for technical men who have electroplating problems along with other work.

★ ★ ★

**The book** discusses all the important aspects of practical electroplating without going into the involved details of electro-chemical theory. The necessary fundamentals, such as bath voltage, polarization and current distribution, are discussed. The book may be used for trouble shooting, so often necessary in this field.

★ ★ ★

**The characteristics** of plating baths, the behavior of electric current during plating, the deposit, the composition of common plating baths, control methods and analytical procedures are well covered. Special chapters are devoted to alloy plating, continuous plating, diffusion coatings, copper plating for selective carburization and to commercial applications. The most frequently encountered plating troubles, their causes and measures for avoiding them are treated in a separate chapter.

★ ★ ★

**The operating** details of common plating baths are described in the light of recent improvements. Some new methods and techniques have also been presented, based on the authors' experience in electroplating.

★ ★ ★

**The book** contains 250 pages and sells for $5.00 a copy.

★ ★ ★

Send in
Your Order Now
for the
1951 Wire Buyers Guide

### Bulletin on Lacquers

**The New England Lacquer Company,** King Philip Road, East Providence, R. I., recently issued two interesting booklets.

★ ★ ★

**One** of these is on Lacquer for Molded Polystyrene and the other is concerned with the facilities and services of the company in connection with lacquer for electric wire and cable.

★ ★ ★

**Either** or both bulletins may be secured upon request.

★ ★ ★

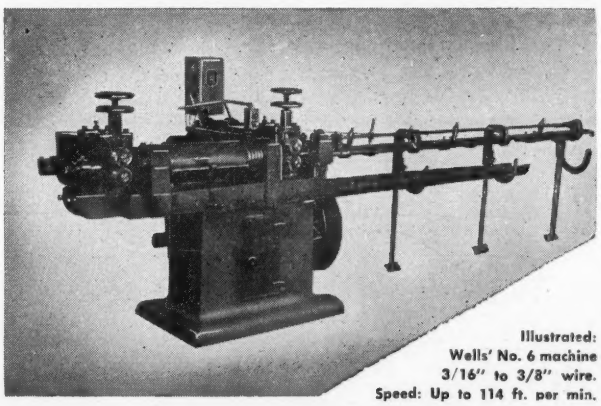
### Bulletin on Fast Carbide Service

**The Carboloy Company,** Detroit 32, Mich., has issued a bulletin "Get Faster Die Service", describing the arrangements they have set up to provide their customers with fast, local die service and expert technical assistance from conveniently located field engineers. Copies of this bulletin may be procured by addressing your request to the Carboloy Company. In this bulletin they invite your investigation of their facilities to serve you promptly and competently.

★ ★ ★


**9 YEARS OF** STRAIGHTENING AND CUTTING

***AND STILL GOING STRONG!***



Illustrated: Wells' No. 6 machine 3/16" to 3/8" wire. Speed: Up to 114 ft. per min.

**One user who has three makes likes WELLS' Machines because they've stood up under severest conditions, operating practically 24 hours a day for 9 long years.**

**This WELLS' customer has been cutting ⅜" hot rolled rods, with tolerances of ±1/8" at 120F.P.M. In spite of the scale, his WELLS straighteners and cutters have carried on uninterruptedly with great speed and accuracy.**

**WELLS machines will do the same for you. Will handle 1/16th to ⅝" stock. Backed up 57 years of experience, machines are rugged, dependable, precision made.** ***And low in cost!***

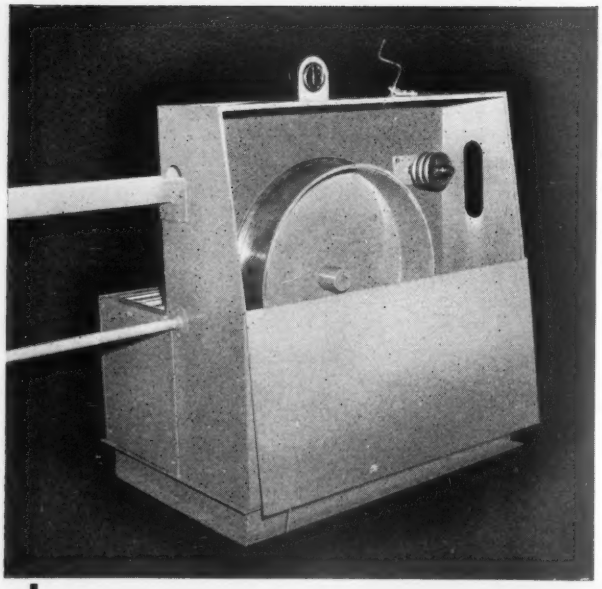
***Get the facts. Send for catalog No. 50, describing these and other WELLS wire working machines. Address inquiries to:***

*Frank L. Wells Company*

**5821 FIFTH AVENUE**

**KENOSHA** **WISCONSIN**

**Builders of Wire Making Machinery**



***35,000,000 FEET OF WIRE RUN ON FEDERAL CAPSTANS FOR SIX MONTHS PERIOD WITHOUT A BREAKDOWN.***

**These machines are equipped with variable torque controls. They are new in design, so engineered and built as to be the *most efficient take-up machines on the market.***

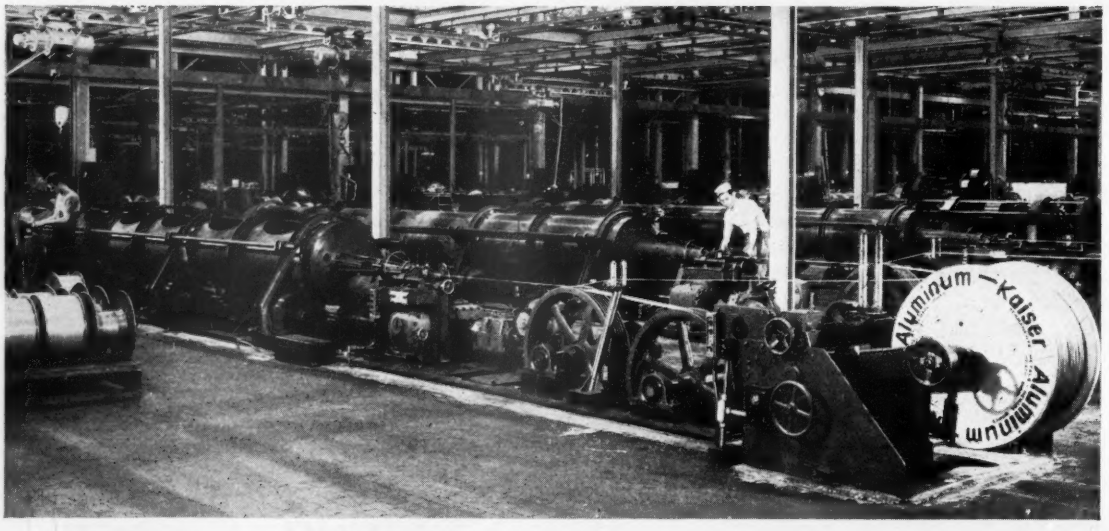
**Have wide range of speeds—up to 2500 ft. per min. Heavy, rugged steel construction gives long life and smooth dependable service.**

***Write today for literature***

***Use FEDERAL —***
**CAPSTANS**
**TAKE-UPS**
**PAY-OFFS**
**WIRE TWISTERS**

*Federal Manufacturing Co.*
SPECIAL WIRE MACHINERY
*236-240 Hall Avenue, Wallingford, Conn.*

**NEW 22" SPOOL 750 RPM TUBULAR STRANDER**
HYDRAULIC LIFT REEL STAND — INFINITELY VARIABLE TRAVERSE AIR CONTROLLED
ROUBLE DRUM HAUL-OFF WITH LINK BELT P.I.V. — AIR OPERATED BAKING SYSTEM

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HUGHESVILLE MACHINE & TOOL CO.
54 ACADEMY STREET
HUGHESVILLE, PA.
'Phone: 129-A

## New J. L. E. Equipment

**One** of these is a new reeler developed by the **James L. Entwistle Company** for reeling insulated wire or other material at constant-wire speed.

★ ★ ★

**One** of its outstanding features is the fact that it can be stacked 2 or 3 units high, making it the ideal take-up where floor space is at a premium. Whether stacked or used as a single unit, each machine has its individual drive, traverse and controls. Constant wire speed is maintained through Capstan drive; all speeds are supplied to customer's specification.

★ ★ ★

**The reelers** are available in right- and left-hand assemblies, allowing one operator to conveniently run as many as 6 machines. The traverse is infinitely adjustable for wire lay and reel width, and the tension of the wire as it is wound onto the reel is also easily adjustable. The J. L. E. Type R-24 Reeler will handle reel sizes up to 24-inch diameter.

★ ★ ★

**The other** new machine is for wire insulation patching. It is a complete, floor-mounted unit for repairing faults or breaks in the insulation of thermoplastic or rubber-covered wire.

★ ★ ★

**The principal** features of this unit include heated platens which have ample size and heat capacity. The upper platen, which has a 4-inch controlled-speed stroke with ample pressure from a JLE Pneumatic Double-acting Air Cylinder, is controlled by a foot-operated, 4-way valve. The temperature of the platens is automatically held within close tolerance by a dial-type thermostat graduated from 200 to 500 degrees Fahrenheit. The cartridge-type heaters have long life and are easily replaceable. Patching die-sets are available to handle wires to customer's wire diameter specifications.

★ ★ ★

**Complete** information on either or both of the above can be obtained by requesting Cat. Sec. 4G-1 and Cat. Sec. 21E1. Write the James L. Entwistle Co., 43 Church Street, Pawtucket, R. I.

## Elgin Offers Special Carbide Conservation Kit

**To help** carbide tool users extend the production life of critical carbide tipped cutting tools, the Industrial Products Division of the Elgin National Watch Company, Elgin, Illinois, announces the availability of a special "Carbide Conservation Kit", for lapping Carbide Tools.

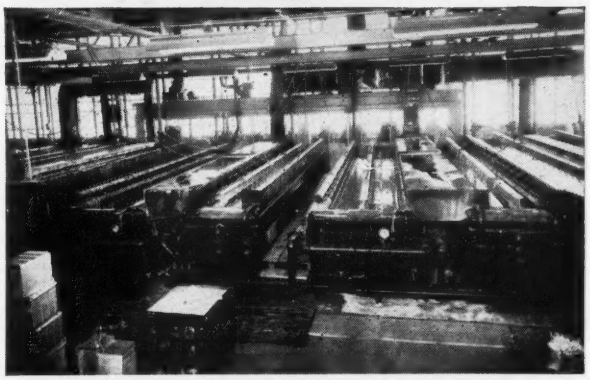
★ ★ ★

**Contained** in the Elgin "Carbide Conservation Kit" are a 6″ diameter formica lapping wheel, a DYMO applicator gun specially modified to facilitate charging of the wheel and 5 grams of Elgin DYMO Diamond Compound, sufficient for lapping approximately 500 average, single point carbide tipped tools.

★ ★ ★

**Diamond** lapping, a simple process requiring no more time in most cases than grinding, has been proved in numerous production tests to increase the life of carbide tipped tools from 2 to 10 times. Lapped cutting edges hold up longer and less carbide is removed in re-grinding. In addition, diamond lapped cutting tools produce finer piece part finishes.


This Program Gives You
PERMANENT PROTECTION *Against Corrosion*
During METAL FINISHING!

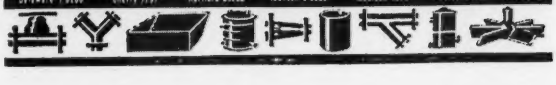


To help you *permanently* control corrosion of equipment used for metal finishing, Haveg Corporation offers you this 2-point program:

1. Personal cooperation in the engineering and installation of Haveg tanks and other equipment
2. Complete manufacturing facilities to mold Haveg equipment to fit your individual needs

This means a *permanent* solution to your corrosion problems during metal finishing. That's because molded plastic Haveg is resistant throughout its entire mass to practically all solutions used for finishing metals. Moreover, you have equipment virtually tailor-made for longer service life, improved production. Many standard shapes available—including tanks, piping, fittings, valves, etc. Write for new Haveg Engineering Bulletin F 6.

HAVEG CORPORATION
NEWARK 47, DELAWARE
FACTORY: MARSHALLTON, DEL. · TEL. WILMINGTON 3-8884



**For further** information and prices on the new Elgin "Carbide Conservation Kit" address inquiry to the **Industrial Products Division, Elgin National Watch Company,** Elgin, Illinois.

★ ★ ★

### Improved Magnifying Lens Illuminates Work

**The Abbeson Supply Company** announces that an Improved Flash-O-Lens is now coming off the production lines after exhaustive tests.

★ ★ ★

**This** instrument combines a 7 power magnifying glass with a powerful light built right into the handle that clearly illuminates the magnified field of vision without throwing direct rays in the user's eyes. It is light and portable so that accurate inspections can be made even in the darkest corners. It spotlights the work it magnifies.

★ ★ ★

**In this** model a new Bausch & Lomb Lens system has been incorporated to give a cleaner, flatter field of vision and to reduce distortion and aberration. The housing for the lens system is now made of a plastic giving a 275% increase in strength over former models. The case is now made of steel with a hard industrial chrome finish. The price is $14.85.

★ ★ ★

**Further** full information and literature may be obtained from the ABBEON SUPPLY COMPANY, 58-10 41st Drive, Woodside, New York.

★ ★ ★

### Hunter Spring Company Making Force Indicators

**The Hunter Spring Company,** has announced for the first time engineering specifications on all 12 models of the force indicator, a precision instrument widely used for accurate force measurement in design, research, production, inspection and maintenance. Operation of the force indicator, types of loads measured, typical applications, accessories and use of the six stainless steel attachments are covered in a new company bulletin.

★ ★ ★

**Five** models are calibrated in pounds at maximum capacities of one, two, five, 10 and 20 pounds. Four models have capacities of 16, 32, 80 and 160 ounces, and three models are rated at 500, 1,000 and 5,000 grams. A full-scale replica of the dial face of each model is given to permit determination of the models most useful in particular applications.

★ ★ ★

**The Hunter** force indicator may be used with the six special attachments to measure thrust or pull in compressive loads, tensile loads, friction forces, lever mechanisms, clutch applications, spring loads and torque loads.

---

CHICAGO, ILL.—The Wire Association Annual Convention, October 22-25, 1951 at the LaSalle Hotel. Ralph B. Roth, Ludlow-Saylor Wire Co., Chairman of Program Committee. Please mark these dates on your calendar now. Full details will be published in WIRE AND WIRE PRODUCTS in July.

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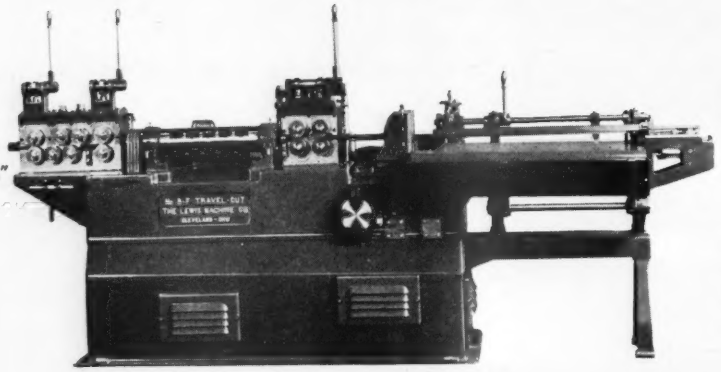
*Fast, Accurate, Economical*

**STRAIGHTENING and CUTTING**

*with* LEWIS **TRAVEL-CUT**

**MACHINES**



22 Models to handle from 1/16" to ¾" Round, Hex, Flat, Shapes.

Simple in design, rigid in construction, Lewis TRAVEL CUT will deliver continuous dependable service under the most severe, high production conditions—day in, day out. Feeds wire from the coil, straightens accurately, gauges to uniform length, and cuts clean without stopping the wire. For steel, brass, aluminum and alloy wire. Cut your cutting costs with the Lewis TRAVEL CUT. Full details on request.

*Exclusive Representatives*

EAST: Penn Machinery Co., 117 North Third Street, Philadelphia 6, Penn.

MIDDLE WEST: Steel & Wire Machinery Co., 13457 Euclid Ave., Cleveland 12, O.

CENTRAL: Moslo Machinery Co., 2443 Prospect Avenue, Cleveland 15, Ohio.

WEST COAST: Hoffman & Heartt, 3005 So. Grand Ave., Los Angeles 7, California

CANADIAN: Empire Engineering Co., 11 Wellington St. E., Toronto 1, Ontario.

CONTINENTAL EUROPE: Gaston E. Marbaix Ltd., Devonshire House Vicarage Crescent, London S. W. 11, England.

**The LEWIS MACHINE Company**

3441 E. 76th Street, Cleveland 27, Ohio

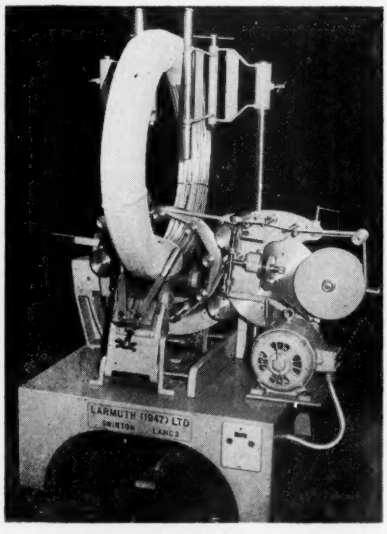
*Also agents in Paris, Stockholm, Rotterdam, Brussels, Zurich, Milan, Bombay and Melbourne*

## Larmuth Paper Wrapping Machines To Be Sold in the U.S.A.

**Marshall Richards Machine Co., Inc.**, 1100 South Broad St., Trenton, N. J., have been appointed exclusive agents by Larmuth (1947) Ltd. of Swinton, Lancashire, England, for Larmuth's paper wrapping machines. The franchise covers the United States.

★ ★ ★

**The new** power-driven machines are said to embody a number of novel features. The equipment is designed for the toriodal over-wrapping of coils of cable or wire with Kraft, crepe-paper or other material. They are made in two standard sizes the smaller covering a range of sizes from 8 to 24 inch diameter coils; the larger covering diameters larger than 24 inches.




Larmuth's Paper Wrapping Machines

★ ★ ★

**A feature** of the machines is their versatility. Besides coils, they can be used to wrap bundles of bars, rounds, tubes and sections, with adjustments for this work made in a few seconds.

★ ★ ★

**An ingenious** wrapping principle is used, the material being carried around the coil by a horseshoe-shaped shuttle, which permits drawing paper from a larger reel than would be possible if the reel had to be passed through the open center of the coil. Evenly tensioned and precisely applied spiral wrappings are obtained that make a tight, strong package.

★ ★ ★

**Several** other features indicate a nice attention to detail in the design, all of which make for fast and economical wrapping. Parts are massive, accurately machined, smooth in operation and quiet. The machines are said to meet practically any wrapping operation that will be encountered by the wire and cable industry.

★ ★ ★

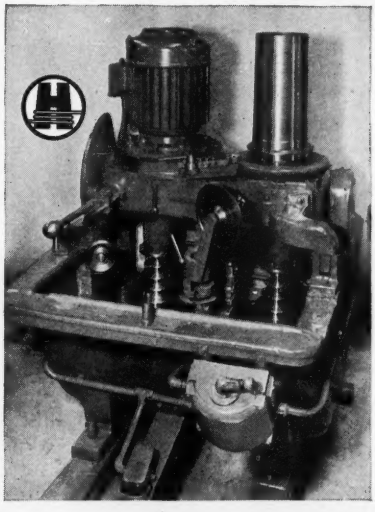
**L. D. Seymour**, General Manager of Marshall-Richards Machine Co., Inc., will be glad to furnish full details upon request.

★ ★ ★

## Wean Equipment Corp. Appointments

**W. H. Millan**, appointed district engineer for the WEAN EQUIPMENT CORP., Cleveland. Other appointments are: **W. E. Heineman**, formerly production manager; **R. P. Popp**, formerly assistant purchasing agent; **I. W. Spraitzar**, formerly associated with the Wean Engineering Co., Inc.


# HERBORN
## WIRE DRAWING MACHINERY



**HERBORN High-Efficiency 11-Die Wire Drawing Machine, Model TF IIIa**

for the drawing of iron wires, starting size .0591", finishing .0236" or less, and of steel wires from .0473" to .0197" or less; for phosphor bronze and other hard wires from .0473". 10 hp. motor with change-speed gearbox.

FOR all metals, from wire rod to finest fractional dimensions with single and multiple draw.

*Herborn* High Efficiency Multiple Wire Drawing Machines are unsurpassed in efficiency and economy.

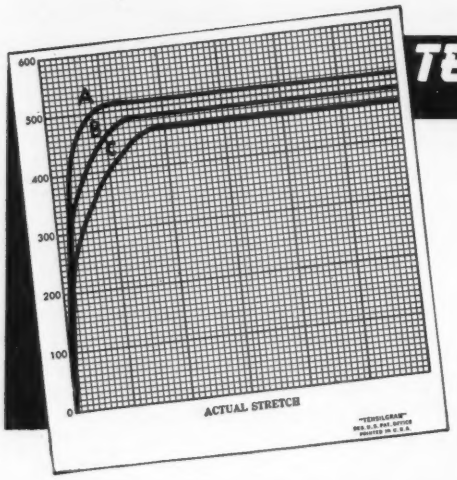
Continuous electric patenting, tempering and annealing equipment for wire, rod and strip, tinning and galvanizing installations.

The complete range of types, sizes and capacities, covered by Herborn Wire Drawing Machinery, provides the most efficient solution for your wire drawing operations.

*Particulars and prices on request.*

KO CO., INC. INDUSTRIAL IMPORTERS

KURT ORBAN CO., INC.
21 WEST ST., NEW YORK 6, N. Y
642 Union Commerce Bldg., Cleveland 14, Ohio




TESTED IS TRUSTED

Control of Supplies for UNIFORMITY

Scott Testers* enable you to determine the uniformity of incoming supplies, by simple tensile tests, as above. These graphic presentations are in permanent form, suitable for mailing or for insertion in a standard letter file, thereby retaining a history of the uniformity.

REQUEST CATALOG 50

*Registered Trademark

SCOTT TESTERS, INC. 55 Blackstone Street Providence, R. I.

Scott Testers — Standard of the World

New Arrival
TYPE "OS"
HYPREZ DIAMOND COMPOUNDS

Now Two Types
Available in 18-gram and 5-gram color-identified, dust-proof cartridges for use with the Hyprez Applicator Gun.

Developed and Shop-Tested for
WIRE DIES AND TOOLS
HOLE SIZING AND FINISHING
TUNGSTEN-CARBIDE FINISHING

Same quality, same grades, same prices as "W" compounds, which remain the universal diamond abrasive for finer, faster finishing.
All Hyprez Diamond Compounds are formulated of accurately-graded diamond particles of lasting cutting power—evenly and permanently suspended in a scientific vehicle.

Write for Free
Hyprez Lapping Stick
Available in square, round or rectangular 6-in lengths. Address Dept. W-551.

HYPREZ DIVISION
ENGIS EQUIPMENT CO.
431 S. DEARBORN ST. CHICAGO 5, ILL.

## Armco Booklet on New Stainless Steels

**A new** booklet, Armco Precipitation Hardening Stainless Steels, has been published by **Armco Steel Corporation.** It describes the properties, available forms and fabrication of both Armco 17-4 PH and 17-7 PH stainless steels.

★ ★ ★

**These** are the new stainless grades that combine excellent corrosion resistance with high strength and hardness, good fabricating characteristics, and can be hardened at low temperatures.

★ ★ ★

**Included** are data on high temperature properties, fabrication, and forms in which the steel is supplied. Photographs show typical applications for Armco 17-4 PH stainless steel, which can be heat treated at 850-900 F to a tensile strength of 190-210,000 psi and a hardness of 40-45 Rockwell "C".

★ ★ ★

**The section** on Armco 17-7 PH stainless contains similar information. After processing 17-7 PH has a tensile yield strength of 150-190,000 psi, a compressive yield of 160-200,000 psi, and a hardness of Rockwell "C" 40-45.

★ ★ ★

**The booklet** also outlines the properties of Armco 17-7 PH stainless steel wire. It describes this wire, which combines excellent corrosion resistance with elastic properties comparable to high carbon spring steels.

★ ★ ★

**Copies** of this informative booklet can be obtained from Armco Steel Corporation, Middletown, Ohio.

★ ★ ★

## Composite Wire With Many Uses

**A relatively** recent product whose use is widening rapidly is nickel-clad copper wire for service where temperatures are high, where corrosive conditions exist, or where combinations of these factors are encountered.

★ ★ ★

**The wire** is produced by drawing down nickel tubing over copper rod in a series of operations to provide a solid element in which the two materials are firmly and permanent-

ly joined together by a mechanical bond.

★ ★ ★

**Combining** the excellent electrical conductivity of "OFHC" copper with the heat and corrosion resistance of nickel, the wire is well suited for stranding and for lead wire applications, especially where high temperature working of glass, such as in radio and television tubes, might embrittle copper. Growing uses of even greater importance include electrical leads for aircraft, aircraft spark plugs, electrical furnaces, jet engines, other industrial and laboratory equipment and domestic appliances.

★ ★ ★

**Conductivity** of the material is 70 percent that of copper, but it does not oxidize, flake, or suffer from embrittlement under high temperatures which may be involved in fabrication operations or in service. This might occur with bare copper. It is readily welded to itself and to other materials.

★ ★ ★

**In the** manufacture of the wire, Superior Tube Company, Norristown, Pa., draws down the copper rod in its tubular nickel shell to composite rod sizes between ½ an inch and ⅜ of an inch in diameter. The wire itself is produced in diameters as small as 5/1000th of an inch by Alloy Metal Wire Company, Prospect Park, Pa., and by Sylvania Electric Products, Inc., Warren, Pa. Various other companies also strand and insulate the final product.

★ ★ ★

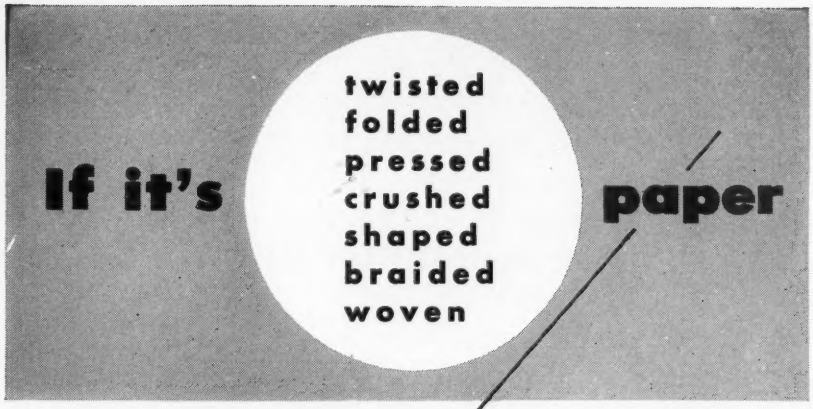
**The safety** feature of the oxidation resistant outer shell of nickel on communication and control wiring is an important factor in the use of this material.

### White-Hot Ingot Shipped By Rail

**A saving** of nearly two months of processing time was achieved when a white-hot ingot was recently shipped by rail from Dominion Iron and Steel Limited, Sydney, Nova Scotia, to Trenton Steel Works Limited, 200 miles away in Trenton.

★ ★ ★

**In what** is believed to be the first such shipment anywhere, the 30,-


**TWITCHELL makes it**

**treated braiding and wrapping yarns**

**treated wire-rope cores**

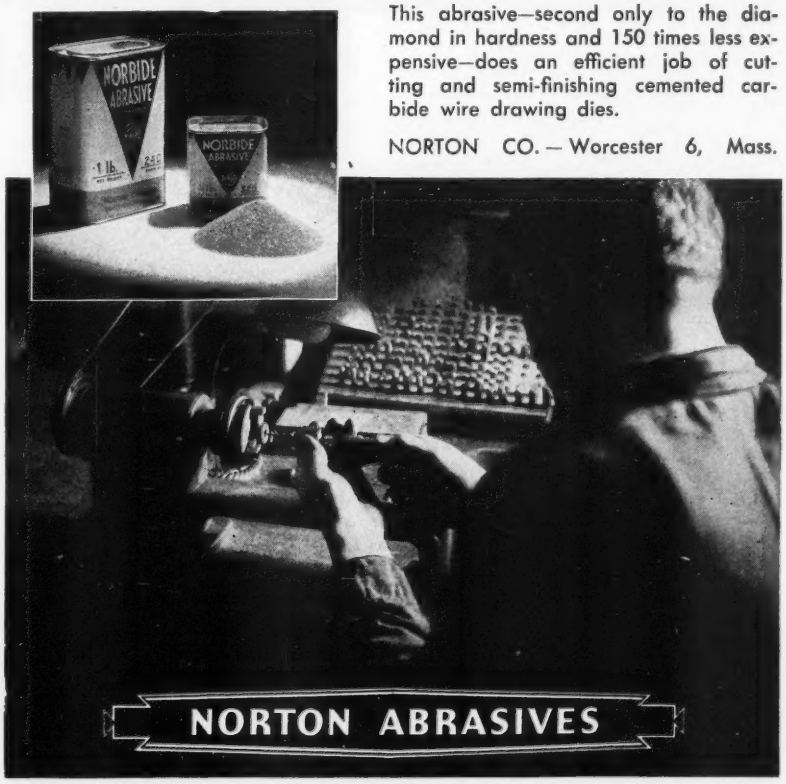
**slit kraft or jumbo rolls** for crushing and wrapping operations.

**treated fillers** for 2- and 3-wire non-metallic sheathed cable, varnished cambric, shipboard, parkway, and other power cables.

E. W. TWITCHELL INC.

Third & Somerset Streets, Philadelphia 33, Pa.

**NORBIDE Abrasive: Effective, Economical**




This abrasive—second only to the diamond in hardness and 150 times less expensive—does an efficient job of cutting and semi-finishing cemented carbide wire drawing dies.

NORTON CO. — Worcester 6, Mass.

# AMCARB

## TUNGSTEN CARBIDE PRODUCTS

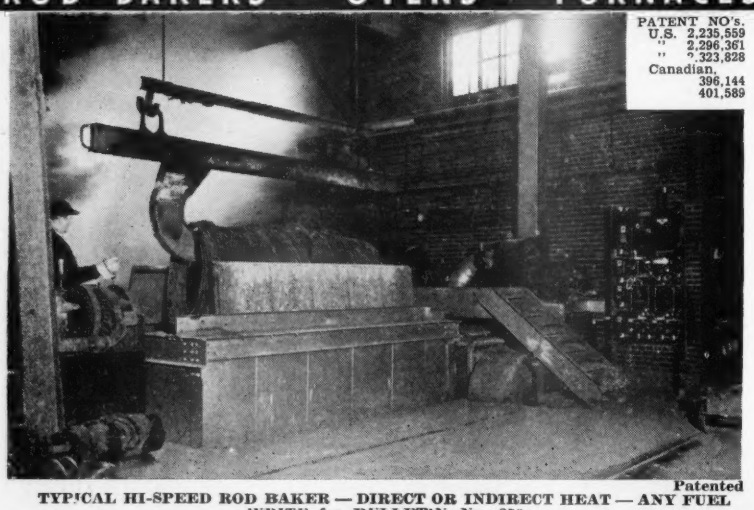
*Diemakers for Industry*

***AMERICAN CARBIDE DIE CO.***

***UNION CITY, N. J.***



**MORE PRODUCTION**
***with* CARL-MAYER HI-SPEED**
**ROD BAKERS - OVENS - FURNACES**




TYPICAL HI-SPEED ROD BAKER — DIRECT OR INDIRECT HEAT — ANY FUEL
WRITE for BULLETIN No. 350

Growing interest in our type of equipment is evidenced by Carl-Mayer installations for such plants as:—

American Steel & Wire Co.
Atlantic Wire Co.
Atlas Steel Co.
Atlas Tack Corp.
B. Greening Wire Co.
California Wire Cloth Corp.
Crucible Steel Co. of America
Eaton Mfg. Co.
Frost Steel & Wire Co. Ltd.
Gary Screw & Bolt
Hollup Corp.
Indiana Steel & Wire Co.
Johnson & Nephew Ltd.
Jones & Laughlin Steel Corp.
Page Steel & Wire Co.
Pittsburgh Tool Steel Wire Co.
Republic Steel Corp.
Steel Co. of Canada
Wickwire Spencer Steel Div.

**THE CARL-MAYER CORPORATION**
3030 EUCLID AVENUE
CLEVELAND, OHIO


000-pound ingot left Sydney with a temperature of 1,770 degrees Fahrenheit late in the afternoon. When the Trenton plant went to work on it the next morning, it still retained a temperature of 1,575 degrees.

★ ★ ★

**This** precedent-shattering trip was made possible because the ingot was insulated with vermiculite, a mineral of the mica family, mined by the Zonolite Company of Chicago.

★ ★ ★

**Traditionally,** such a shipment has been a time-consuming operation. The ingot would have had to be cooled before being transported, a process requiring six weeks. At its destination, it would have had to be reheated for 10 days before work could be continued.

★ ★ ★

**Special** arrangements were made for the trip by the Canadian National Railway, which carried the cargo.

★ ★ ★

**At the** Dominion plant the huge, hot ingot was allowed to solidify in a mold, was stripped and placed in a cast iron box insulated with premolded vermiculite. The remaining space was then filled with loose vermiculite, and a steel lid placed on the box. This was then securely fastened and braced to the railway car floor. ★ ★ ★

**In the** opinion of steel men in that area, this successful test trip may prove to be one of the most important developments in the steel industry in recent years. Reduction in processing time means lower costs, and shipping a hot ingot eliminates the danger of cracks from cooling.

### Metal Carbides Expands

**Metal Carbides Corporation,** Youngstown, Ohio, announces an 8,000 square foot addition to their plant, making total manufacturing area 35,000 square feet. Office space is being doubled.

★ ★ ★

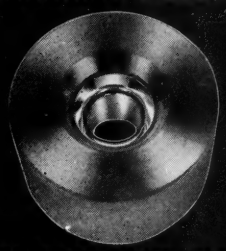
**Over** $100,000.00 of new equipment, including electric furnaces, machine tools, powder mixing and crushing equipment is being added.

★ ★ ★

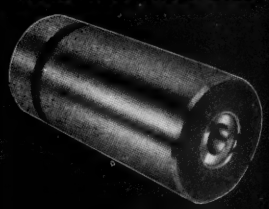
**These** improvements will expand production of Talide tools, tips, dies, rolls and wear resistant parts by over 50% as well as provide additional facilities for producing special tungsten carbide products for the Defense Effort.

# ELGIN ANNOUNCES

A COMPLETELY NEW, FASTER CUTTING DIAMOND ABRASIVE COMPOUND SPECIALLY DESIGNED FOR FINISHING *CARBIDE*



WIRE DRAWING DIES



HEADING DIES

# DYMO-C

Six months of actual shop tests prove DYMO-C removes stock up to 20% faster than diamond powder—olive oil mixtures. In DYMO-C, mixing is eliminated . . . waste reduced . . . "slinging" minimized. Available in jars or applicator guns. Write today for complete information and free demonstration.

ELGIN DYMO DIAMOND COMPOUND . . . pure diamond—crushed, precision graded and compounded by one reliable source—ELGIN. Guaranteed to conform to U.S. Bureau of Standards specifications.

INDUSTRIAL PRODUCTS DIVISION
ELGIN NATIONAL WATCH CO.
ELGIN, ILLINOIS


### Folder on Detergent Cleaning

**A discussion** of how steam-detergent cleaning saves time and work and helps cut costs in connection with industrial maintenance operations is provided in an illustrated folder available from **Oakite Products, Inc.**, manufacturers of industrial cleaning and related materials.

★ ★ ★

**The folder** defines steam-detergent cleaning as the simultaneous application of **three** different actions: (1) the **physical** action of steam pressure and hot water working their way through successive layers of grease and dirt; (2) the **dissolving** action of heat on oils, greases and other deposits; and (3) the **chemical** action of the detergent in penetrating, wetting and emulsifying surface deposits. This cominbation of efficiency factors provides the ultimate in cleaning speed and thoroughness. Typical instances in many branches of industry where this method offers substantial time and work-savings in connection with equipment clean-up operations are carefully enumerated.

★ ★ ★

**The folder** also supplies specifications of the types of steam-cleaning equipment and offers helpful data on the preparation of efficient working solutions for use with this equipment. Readers desiring free copies of this folder may obtain them by addressing Oakite Products, Inc., 152A Thames St., New York 6, N.Y.

★ ★ ★

### Mark Founding Of Copper Industry 150 Years Ago

**The first phase,** in New England of a national 150th anniversary celebration during 1951 of Paul Revere's founding in 1801 of the U. S. copper industry and of **Revere Copper & Brass, Inc.,** was completed April 22nd in New Bedford, Mass., with a reception attended by some 9,000 persons, held in the copper fabricating plant of the New Bedford Division of the Revere Company.

### Fisher Appointment

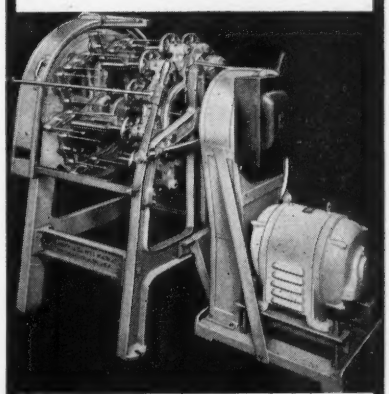
**D. H. W. Fisher** has been appointed assistant to general works manager of the **Oliver Iron & Steel Corp.**, Pittsburgh.

★ ★ ★


# BUDGETING FOR PRODUCTION PROFITS

## . . . Means More Than "PIGGY-BANK" Savings

Your budgeting should be a long-term project . . . with the steady replacement of obsolete equipment. Check the *new, improved* HASKELL-DAWES twisters, ropers, layers, bunchers and stranders. This is the basis for *real* savings —savings earned through increased hourly output and lower unit costs. Born of eighty-two years specialized experience, H-D machines embody many new innovations that increase production efficiency.



12-SPINDLE TWISTER

Our new bulletins should be among your early reading. Write for them — TODAY.

**HASKELL-DAWES**
MACHINE COMPANY, INC.
2231 E. ONTARIO STREET
PHILADELPHIA 34, PA.

**Just Common Sense . . .**

It's just common sense for wire manufacturers to prefer non-returnable spools that meet specifications—and also cost less. That's why more Mason Spools are being used in the wire industry than ever before!

See for yourself how Mason Spools can help save you money. You'll find them available in standard head and barrel sizes.

Write today for samples and a quotation based on your requirements!

**MASON CAN COMPANY**
1949 Dexter Rd., East Providence 14, R. I.
MASON CAN COMPANY OF OHIO
Greenville, Ohio


## Elgin Expands Industrial Finishing Line

**To provide** a more complete service to those companies doing lapping, polishing or fine finishing, the Industrial Products Division of the **Elgin National Watch Company,** Elgin, Illinois, now offers a complete line of accessories to be used with its diamond compound. Included are felt bobs and wheels, abrasive stones, polishing brushes, wood lapping sticks and wheels. They are specially selected for use on plastic molds, carbide dies, drawing and forming dies, and precision parts. These items, marketed under the trade name DYMO, are carried in stock for immediate shipment.

★ ★ ★

**Features** of the new DYMO line are color identification of abrasive stone grades complementing that used for the Elgin Diamond Compound, and a complete selection of standard sizes and shapes in the other items. Detailed catalog information is available on request addressed to the Industrial Products Division, Elgin National Watch Company, Elgin, Illinois.

★ ★ ★

## Norton Forms Distributors' Advisory Council

**Norton Company** has announced the formation of the Norton Distributors' Advisory Council, made up of representatives of eleven Norton abrasive distributors from Connecticut to California. The announcement was made by **Ralph M. Johnson,** vice president in charge of sales, Abrasive Division.

★ ★ ★

**Believed** to be the first of its kind in the abrasive industry, the Norton Distributors' Advisory Council has been organized in an effort to obtain the benefit of the experience of representative distributor men "in order that we can, with the help of our distributors, improve the selling job we are doing. Many of the problems which we have are also the problems of our distributors, and their ideas and suggestions will be of help to us in improving our policies and distribution generally," Mr. Johnson stated.

★ ★ ★

**The first** meeting of a two-day session in Worcester of this new Norton


**SAVE TIN!**

*with*

**STANNOUS SULFATE**

**Use of Stannous Sulfate for liquor finishing baths saves tin, assures more efficient processing.**

*for* **ALL LIQUOR FINISHING of STEEL WIRE**

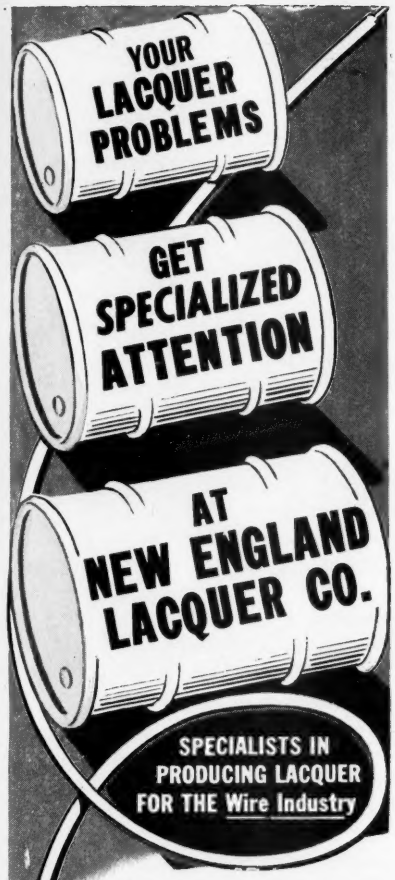
white or straw color

**M & T Stannous Sulfate provides these advantages:**

- **Reduces tin losses by eliminating the high tin sludging common to the acidulated feather tin process.**
- **Makes it easier to control results because only two variables (the Stannous Sulfate and Copper Sulfate concentrations), require watching.**
- **Produces smooth, uniform, wire coatings from day to day and from lot to lot.**

**Write for engineering data on the use of Stannous Sulfate in liquor finishing operations.**

METAL & THERMIT CORPORATION
*Specialists in Tin and Tin Chemicals*
100 East 42nd Street • New York 17, N. Y.


YOUR LACQUER PROBLEMS
GET SPECIALIZED ATTENTION
AT NEW ENGLAND LACQUER CO.
SPECIALISTS IN PRODUCING LACQUER FOR THE Wire Industry

The right lacquer for...

TELEVISION WIRE

EXTREMELY FLEXIBLE!

FLAME RESISTANT!

You can be sure that New England lacquer will readily meet your most exacting coating requirements for television hook-up wire.

Let our specialized experience in the wire industry work for you!

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NEW ENGLAND LACQUER CO.
KING PHILIP ROAD
EAST PROVIDENCE, R. I.


Distributors' Advisory Council was held on April 24 and 25.

### New Bonding Material Developed by G.E.

**A new** chemical has been developed by General Electric's Chemical Department that makes possible a bond between silicone rubber and metals or ceramics that is stronger than the rubber itself.

★ ★ ★

**Designated** as G-E 81267 primer, this new product is a thin, light-colored liquid. By using it, G-E silicone rubber 81223 can be bonded to almost any surface. Bonds to glass, ceramics, aluminum, steel, tin, and copper are possible, and strength measureemnts of bonds on steel are approximately 700 lbs. p.s.i. A unique feature of the primer is its ability, in most cases, to provide a bond strength greater than the strength of the rubber at any stage of the cure.

### Ruff Heads Catalytic Combustion Corporation

**Richard J. Ruff** has been elected President of the **Catalytic Combustion Corporation**, with offices at 4544 Grand River Avenue, Detroit 8, Michigan.

★ ★ ★

**A graduate** engineer from the University of Wisconsin, Mr. Ruff was Professor of Industrial Engineering at Detroit Institute of Technology until 1936, at which time he became associated with Young Brothers Company, Detroit. Starting as Sales Engineer, he advanced to Production Manager and Sales Manager. Early in 1949, with a number of associates, Mr. Ruff formed Michigan Oven Company and served as President until retiring from active participation in April, 1951. During these two years, the company achieved a growth exceeding three-quarter million dollar annual output.

★ ★ ★

**As co-inventor** of the Suter-Ruff Process for Fume Elimination, Mr. Ruff has in recent technical articles, focused industry's attention to the potentialities of catalysis for heat recovery and air pollution control. Tremendous quantities of potential energy, now wasted in the form of Hydrocarbon Vapors and noxious fumes can be converted to useful heat energy with the Catalytic Combustion Process.


NEW!

ROOS

Industrial Type

LAPPING

or

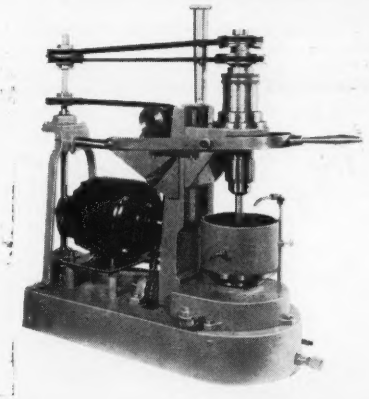
RIPPING

MACHINE

for

Tungsten Carbide

LARGE DIES



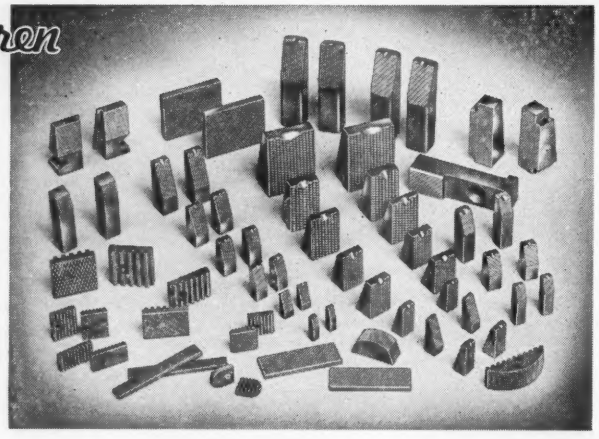
- Capacity up to 5" die casings.
- Chuck capacity ⅜" to ¾" lapping pins.
- New "V" Type drive belts.
- ½ H.P. motor.
- Famous Roos revolving table for efficiency and time saving.
- Prompt delivery schedule.

ROOS TOOL
& MFG. COMPANY
33-35 Bloomfield Avenue, Newark, N. J.
Factory—
17-19 Grove St., Montclair, N. J.
(Suburb of Newark)

*Also Distributed by Carboloy Company, Detroit, Mich., and Canadian General Electric Company, Toronto, Can., or your Die Room Supply dealer.*

Sjogren

JAWS . . . . for Wedge Grips, Pullers and Tensile Testing Machines of all makes are available either from stock or manufactured to order. A Sjogren jaw, made to meet your requirements, guarantees you service.



SINCE S&S 1927

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*Who Want the Best!*

**SJOGREN TOOL AND MACHINE CO., INC.**

WIRE PULLERS • WEDGE GRIPS • JAWS FOR ALL MAKES OF PULLERS AND TESTING MACHINES • CAGE ROLLERS • SWAGING HAMMERS • POINTING DIES • WIRE SPOOLERS

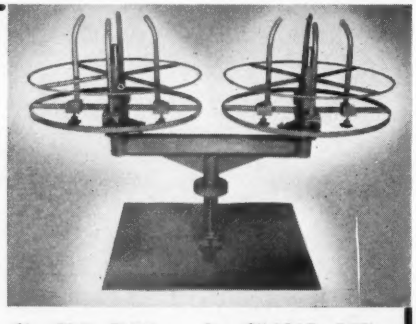
**14 SWORD STREET**
**AUBURN**
**MASSACHUSETTS**

Represented in Canada by THE LARSON CO., 98 Wellington St., West, Toronto, Ont.

Norsholm "Reel Master"

**For Easy Loading and Economy**

***Built in Three Types:***



1) HEAVY DUTY DOUBLE REEL, 2) TILT TYPE, 3) SINGLE REEL.

Engineered by men experienced in all phases of wire working, NORSHOLM REELS embody advanced design features that assure increased production. Are rugged and precision made, built for endurance and high efficiency. Models vary from small single reels for light wires to large reels for 500 lb. coils of wire. All are ball-bearing equipped.

With the HEAVY DUTY DOUBLE REEL, shown above, greater yield from wire equipment is possible. As the wire is pulled from one reel, the other is loaded, eliminating down-time. Foot pedal allows reel to index 180° to make ready for new coil.

---

Also makers of STRAIGHTENING AND CUTTING, WIRE FORMING, and PIN CUT-OFF machines. All fast, dependable, efficient.

Send for descriptive bulletins.

**NORSHOLM INDUSTRIES**

**307 WEST AVON RD.** **ROCHESTER, MICH.**

## New Steels Will Save Critical Alloys

**After** months of intense work, a steel industry committee succeeded in developing new types of steel which will stretch the nation's supply of critical alloying elements. An important part in this development is played by a common element, boron, although its actions are not thoroughly understood.

★ ★ ★

**The committee** in mid-1950 foresaw overwhelming demand for the alloys contained in standard, heavily alloyed steels. Those alloys would be required almost entirely for jet aircraft, atomic energy and other expanded defense programs, and leave little for other alloy steels. It would be necessary to develop leaner alloy steels for automotive gears, engines, transmissions, certain parts of farm equipment and scores of other ordinary uses, without sacrificing the physical properties of the steel.

★ ★ ★

**In steel company** laboratories it was found that the amounts of alloying elements, nickel, chromium and molybdenum could be reduced about 50 per cent, provided small quantities of boron were used carefully. Boron, abundant in the borax deposits of Death Valley, California, peps up the performance of the lean alloy steels. It increases the hardenability of the steels; that is, the ability of the steel to harden deeply, when heat treated, by quenching and tempering. That action, as yet unexplained, increases the strength of the steel without reducing its toughness.

★ ★ ★

**Two series** of steels have been developed for practically all the engineering and constructional purposes for which standard alloys steels are used. The new steels, which are balanced multiple alloy steels, are designed to make maximum use of the alloys contained in scrap. Both series contain an average of 0.30 per cent nickel and 0.12 per cent molybdenum; plus boron. One series contains an average of 0.25 per cent chromium, the other 0.43 per cent.

★ ★ ★

**During** the making of the new steels, close control must be maintained by steelmakers. And users must have close control over their

★ ★ ★

heat treating methods. However, such controls can be maintained. That was proved in World War II when the United States used leaner alloy steels than any other country.

★ ★ ★

**The new** steels contain only half the quantity of critical elements contained in the N.E. steels of World War II.

★ ★ ★

Steel companies took prompt steps to help protect supplies of critical alloying elements in mid-1950. The production of nickel-chromium and nickel-molybdenum grades declined 37 per cent and 47 per cent, respectively, in the last six months of 1950. The output of triple alloy steels rose 69 per cent in the same period.

### Catalogs on Telephone Cable

**The** electric wire and cable department, United States Rubber Co., has published a catalog on specifications and engineering characteristics of latex insulated telephone cables. Statistics on capacity and power factors, transmission characteristics, aging, tensile strength, resistance and constructions, are included. A section is devoted to a new cable splice housing developed by company engineers which eliminates hand taping. The booklet is obtainable from the department at 1230 Sixth Ave., New York 20, N. Y.

### Continuous Automatic Processing Equipment

**A 16 page** booklet of the above title presents a timely and practical exposition of some of the more advanced machine design elements involved in continuous coating equipment for such web materials as textiles, papers, films and foils, and strand materials such as wires, cables and synthetic monofilaments.

★ ★ ★

**It is** a clearly written, easy-to-follow discussion of various types of complete coating systems and the many different component elements which they embrace. Detailed treatment is given.

★ ★ ★

**The booklet** utilizes to good advantage some fifty drawings and photographs keyed to the text. Copies may be obtained without charge by writing to **Industrial Ovens, Inc.**, 13825 Triskett Rd., Cleveland 11, Ohio.


**IMMUNOL** ...And Any Water Prevents Looping And Rusting in a Single Operation!

Coils of wire dipped in an IMMUNOL solution before spooling are freed of caking and stickiness which cause looping. Wire is clean and free running as it goes on the spool, and at the same time is protected from rust by a non-oily, invisible film of IMMUNOL. Rust formation on the machines during weaving is prevented as well.

IMMUNOL is neutral, non-inflammable, odorless and will not affect the skin. Mixes readily with any kind of water to make a safe, practical, easy to handle solution.

Outstanding for use as a rust preventive, detergent and wetting agent for all types of cleaning and rust prevention. Ideal for protection of wire in packaging or indoor storage where clean, invisible non-oily film is desired. Send for booklet.

**Haas MILLER Corp.**

**4th & Bristol Sts.** **Philadelphia 40, Pa.**

***Leading British Manufacturers use***

**Prolite** **DRAWING DIES**
CEMENTED TUNGSTEN CARBIDE

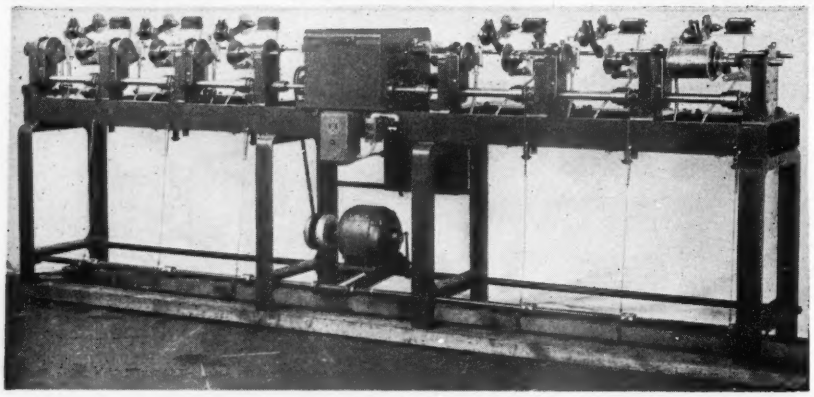
THE 'PROLITE' RANGE OF MUREX METALLURGICAL PRODUCTS *includes:*

Tungsten Carbide Tips and Tipped Tools, Bar, Tube and Wire Drawing, Extruding and Metal Forming Dies and Die Pellets, Cold Heading Dies, Nozzles, Guides, Bushes and other Wear Resisting Parts.

**MUREX LTD.** *(Powder Metallurgy Division)* RAINHAM • ESSEX • ENGLAND
*London Sales Office:* Central House, Upper Woburn Place, London, W. C. I.

MACHINERY FOR WIRE

**WINDING • SPOOLING • COILING**



Illustrated: Six-Spindle Multihead Winding Machine

The Winder shown above has a main control box with a single screw reversed by a solenoid control for traverse of wire guides. Each head individually controlled by a pre-determined measuring device.

*Send for information on this winder and our complete line of BOYD-FIDELITY SPOOLERS*

**BOYD & SONS MANUFACTURING CORPORATION**

**1434-38 Callowhill St., Philadelphia 30, Pa.**

## Increasing Productivity in Old Plants Through Modern Materials Handling

(*Continued from page* 402)

tory were located in the center of the building, taking up valuable production space, and were not wholly adequate to handle the flow of materials from floor to floor when it became necessary to transfer so much material from one building to the other.

★ ★ ★

**The management** realized the prohibitive cost of this antiquated operation and arranged for an elevator company to make a survey. The engineers recommended the placing of an elevator shaft between the two buildings for the installation of a modern freight elevator and also a passenger elevator. A great improvement in the efficient flow of materials resulted when the plan was put into effect and the old elevators removed.

★ ★ ★

**When** installing the new elevators, the difference in the elevation between floor levels in the two adjacent plants was a special problem. This was solved by using elevators which have doors on two sides. The new elevator takes its load on the fourth floor of the manufacturing building, then goes up two feet and discharges the material in the warehouse building for distribution to stock.

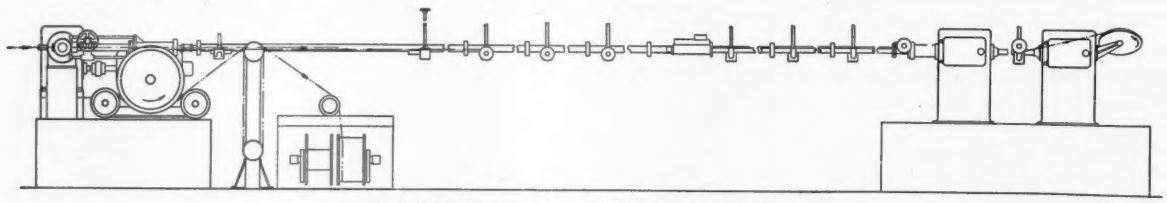
★ ★ ★

**Where old** one-story plants are separated by a wide open area, it has often been found that roofing the area over will not only improve efficiency of operations, but also provide additional warehouse space. It usually provides a more useful area too. Although the yard may have been used for storage previously, covered with a roof, the area becomes more liable to orderliness and good housekeeping.

### Technological Methods, Not Age Of Plant Determines Its Modernity

**As I** have been talking here, you've probably thought of many other solutions to problems of mechanized handling in old plants. Each plant will have certain problems and no two will be alike even in plants making the same product in the same type of building.

★ ★ ★



DAVIS-STANDARD CONTINUOUS VULCANIZING EQUIPMENT

**COMPLETE CONTINUOUS-VULCANIZING UNITS**

**THE STANDARD MACHINERY COMPANY, MYSTIC, CONN., U. S. A.**

*Established in 1848* *Incorporated in 1875*

Export Office: Drexel Bldg., Philadelphia 6.
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## Master-Made
## DIAMOND DIES

## Product of MODERN SCIENCE and MASTER CRAFTSMANSHIP

● The tools of modern science are combined with the skills of the master craftsman in the production of PHILIPS *master-made* Diamond Dies.

Every diamond selected for cutting is examined by PHILIPS X-ray diffraction apparatus to determine the proper direction for drilling to provide longer life and greater satisfaction to the user. Master craftsmen of long experience, working under the most modern conditions, drill each diamond to precision tolerances. Result? The finest diamond dies obtainable—now available to American industry under the trade name of NORELCO Diamond Dies.

All sizes . . . from .000275 to .100 are available at competitive prices. Let us consult with you concerning your requirements.

Norelco

**NORTH AMERICAN PHILIPS COMPANY, INC.**

Dept. FE-5, 100 East 42nd St., New York 17, N. Y.


**Two factors** that most frequently govern the solution of modernizing materials handling methods in old plants, or for that matter any productive modernization, are the setup that now exists, and the amount that you can spend to replace the present system with something better. Other important factors you might add to these are the amount of engineering imagination and ingenuity available, either in your own organization or in the consulting engineers, and how much free reign it's given.

★ ★ ★

**And it's** important to remember that no old plant is absolutely hopeless. Certainly a plant, old or new, may lack flexibility, and may not please the eye in appearance, but it is not its brick and mortar shell that governs the unit cost of its products, it's how you fabricate them, how you assemble them, and how you handle them. In conclusion, gentlemen, it's not the age of the building but the technological methods employed that really determine the modernity of any plant.

### Sheet & Tube Plans Expansion at Chicago

**At the** annual meeting of Youngstown Sheet & Tube Co., chairman Frank Purnell announced that the company is planning to increase the annual ingot capacity of its operations in the Chicago district by 1,000,000 tons, at a cost of about $100,000,000.

★ ★ ★

**When** the expansion program is completed about half the company's ingot capacity will be at Chicago and the remaining half at Youngstown. Presently Youngstown accounts for about two-thirds of the capacity and Chicago one-third. Mr. Purnell expressed the view that the relative capacity now planned will give the company better balance in the consuming market and materially strengthen its position for the long pull.

---

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# PORTER CARBIDE-EDGED CUTTERS

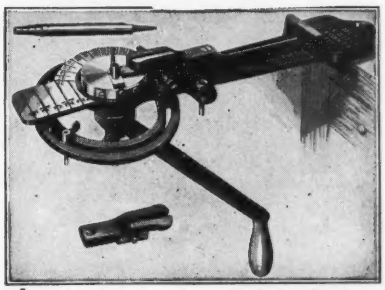
**for extremely hard materials, including stainless steel.**

Stand up under the hardest usage. Tough carbide edges firmly brazed to cutting jaws. Excellent for extra hard materials like stainless steel rods, wires, pins, etc. #3 cuts to 5/16" diam. #4 cuts to 3/8" diam. Pay for themselves many times over!

*ORDER THROUGH YOUR INDUSTRIAL SUPPLY HOUSE*

**H. K. PORTER, INC.,** Somerville 43, Mass.
Manufacturers of PORTER CUTTERS, PORTER PRUNERS and PORTER-FERGUSON Auto Body Fender Repair Tools

# KILMER WIRE FORMER



Forms Eleven Sizes of Eyes from Flat, Round, Square or Half-Round Stock, also Almost Any Shape Desired

**Adjustable for No. 8 to No. 21 Gage Wire**

The cut on right shows a few of the thousands of the forms made on this **WIRE FORMER**

**M. D. KILMER & COMPANY**
4840 BROOKPARK RD.
CLEVELAND 9, OHIO

**MUSIC WIRE and SPECIAL WIRES**

Music Wire for Industrial Purposes

In Over 100 Sizes, Polished and Tinned, from .0015" to .359" in dia.

Aluminum — Annealed — Belt Lacing — Brass, Soft and Spring — Copper, Bare and Tinned Coppered Steel Spring — Galvanized — Tinned

Monel — Nickel Silver — Pure Soft Nickel — Oil tempered, Steel Spring, Black Finish Phosphor Bronze, Spring Temper — Picture Wire — Iron Wire, Pure — Resistance Wire, Hoskins Chromel "A" — Stainless, Soft and Spring Temper — Tag Wire, 1000 in an Envelope — Florist Wire — Spooled and Coiled, ¼-½-1-5#

Wires Straightened and Cut to length — Small Gauges — Small orders our specialty

Wires and Strands for the fishermen. Trolling Wires, Copper-Monel-Stainless. Leader Wires, "Wilstabrite" Stainless and "Silverbrite" Music.

**THE MALIN & COMPANY**

2514 Vestry Ave. Established in 1884 Cleveland 13, Ohio



**Buy the Best: MONTGOMERY *Tinsel Wires***

*TINSEL CONDUCTORS* • *SILVER PLATED WIRE*

*TINSEL LAME* • • *TINSEL THREAD*

Bare electrical conductors and resistance elements made to give extreme flexibility and long life. Supplied on reels ready for insulating with rubber, plastic, etc. Used for telephone, switchboard, electric razor, hearing aid, and flexible cord of all kinds, where severe flexing is expected. Meets National Electric Code for Tinsel Wires.

MONTGOMERY IS HEADQUARTERS FOR FINE TINSEL WIRES

*Send for samples and engineering data.*

**THE MONTGOMERY COMPANY**

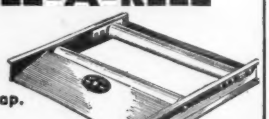
25 Canal St., Windsor Locks, Conn. Tel.: Windsor Locks 14



*Simple as* A B C

Handle heavy reels easily and safely; remove wire or cable from top or bottom, front or back of reel with

**ROLL-A-REEL**



Style A: 2,000 lbs. cap. 37.50

Style B: 4,000 lbs. cap. 75.00

F.O.B. Cincinnati

Low slanted front and positive front lock insure quick loading or unloading.

Eliminate jacks, cumbersome handling.

Carried easily to reels, job or storage.

Sold through wholesalers only.

WRITE TODAY FOR DETAILS

**ROLL-A-REEL**

327 WEST FOURTH STREET

CINCINNATI 2 OHIO



**DIAMOND POWDER RECLAIMING**

A new and more efficient process has been developed that recovers higher percentages of greater purity of used diamond powders.

Diamonds from worn diamond grinding wheels, grinding wheel sludge and dust, cotton charged with powder used in die polishing, die washings and other diamond bearing scrap—all

*RECLAIMED SUCCESSFULLY*

Don't waste valuable diamond bearing material.

Send it to

**NATIONAL RESEARCH CO.**

*25530 Little Mack Avenue*

*ST. CLAIRE SHORES*

*MICHIGAN*


## Almdale Appointed Carboloy District Manager

**E. R. Almdale** has been appointed Manager of the Michigan District for **Carboloy Company, Inc.,** Detroit. Mr. Almdale will assume the position recently vacated by **P. J. Jensen,** who has been called back to duty in the Detroit Ordnance District with the rank of Lieutenant-Colonel.

★ ★ ★

**Mr. Almdale,** a graduate of St. Johns Military Academy and the University of Michigan with a degree in Mechanical Engineering and Metal Processing, joined the Carboloy Company upon his graduation in 1940. Since then he has held various engineering and sales positions with the company.

★ ★ ★

## Dr. Thomas New President of Monsanto

**One of the** nation's leading atomic scientists, **Dr. Charles Allen Thomas,** was elected president of Monsanto Chemical Company in April, replacing **William M. Rand,** who has retired.

★ ★ ★

**Dr. Thomas,** who has been Monsanto's executive vice president since 1947, began his industrial career with General Motors, aiding in the development of ethyl gasoline and later established research laboratories in Dayton, Ohio. The laboratories were acquired by Monsanto in 1936 and Dr. Thomas became the company's research director. He then moved up through successive positions to the presidency.

★ ★ ★

## Standard Varnish Executive Appointments

**Recent changes** in the organization of **Standard Varnish Works** have been announced by the President, **M. H. Corbin.** Mr. Corbin continues as President of the parent company in New York and also assumes the Presidency of the Illinois Corporation, formerly held by **E. E. Day,** who has recently been elected Chairman of the Board of Directors of the Illinois Corporation.

★ ★ ★

**H. H. Rittenhouse** has been elected Executive Vice-President and General Manager of the Chicago plant. Raymond F. Hart, former assistant to the President, is taking over the

duties of Mr. Rittenhouse in New York, as Controller.

★ ★ ★

**H. F. Boehlert,** previously Export Sales Manager is now Industrial Sales Manager under the Vice-President and Director of Industrial Sales, **Carl Bauer.** Mr. Boehlert's former assistant, **C. H. Mac Ronald,** has been promoted to Export Sales Manager.

★ ★ ★

### Y. & T. Announces New Line of Trucks

**A completely** redesigned line of light capacity electric fork lift trucks has been announced by the Philadelphia Division, **Yale & Towne Manufacturing Company,** Philadelphia 15, Pa. Available in capacities up to 2,000 pounds, the new trucks feature simplified automotive-type controls, hydraulic lift, and compact size. They are designed to fill the needs of manufacturing companies and distribution concerns who desire the advantages of sit-down operation, combined with a short wheelbase and maneuverability.

★ ★ ★

### Big New Aluminum Plant Planned

**A new** aluminum smelting plant, capable of supplying 170,000,000 pounds of aluminum annually for America's defense and civilian needs, will be built by Aluminum Company of America, at Wenatchee, Washington.

★ ★ ★

**In announcing** its plans, the company said that construction of the new works would begin immediately. It is hoped that the first aluminum can be produced at the plant within 15 months.

★ ★ ★

**ALCOA** has already reactivated certain standby production facilities at Massena, N. Y., and at Badin, N. C., which are uneconomical for normal operations. This part of the ALCOA program, known as the "quick action" plan, requires the use of high cost power. It will provide 158,000,000 pounds of aluminum annually for the government's stockpile. Already it is supplying metal in substantial quantities for that stockpile.

★ ★ ★

**The second** part of ALCOA's program involves the erection of permanent new capacity by the com-


**REELS SPOOLS**

ALL SIZES

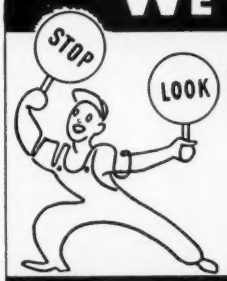
WOOD-PLYWOOD-WOOD-METAL

RETURNABLE NON-RETURNABLE

Samples and Prices on Request

**DURKEE MFG. CO.** PINE RIVER, MINN.

**WE BUY WE SELL**




We Pay Highest Prices for Used Machinery

**WIRE and CABLE MACHINERY URGENTLY NEEDED**

*Send List Immediately*

**WIRE—PHONE or WIRTE**

All Machines Reconditioned in Our Own Shop

**WIRE & TEXTILE MACHINERY INC.**
P. O. BOX 436, PAWTUCKET, R. I.

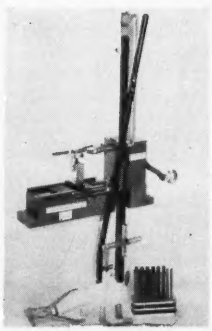
**THE NEWBURY CO.**

*High and Low Carbon Steel Wire*

125 BROAD STREET - BOSTON 10, MASS.

HAncock 6-7788

**SPRING MACHINES**



Lathes, Ovens, Forming Tools

For winding Compression Extension and Torsion Springs. Hand Operated. Ideal for experimental use. Samples and small production runs made quickly and accurately.

For testing deflection and loads of Compression and Extension Springs.

Two Sizes Up to 12½ lbs. and up to 175 lbs.

Write for prices and bulletins.

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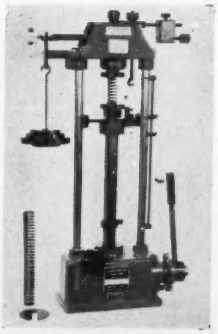

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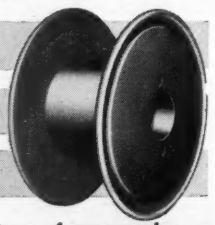

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(*Continued from page* 397)

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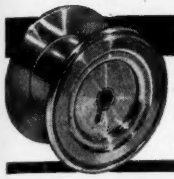

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**ABRASIVES—**
Norton Co., Worcester, Mass.

**ACID INHIBITORS—**
(See Inhibitors, Pickling)

**ACID-PROOF CONSTRUCTION—**
Ceilcote Company, Cleveland, Ohio
Chemsteel Construction Co., Pittsburgh, Pa.
Haveg Corporation, Newark, Del.
Heil Process Equipment Corp., Cleveland, Ohio.

**ANNEALING MACHINES—Open Flame**
Syncro Machine Co., Perth Amboy, N. J.

**ANNEALING POTS AND BOXES—**
Scudder, E. J., Foundry & Machine Co., Trenton, N. J.

**ARMORING EQUIPMENT—**
American Insulating Machy. Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wire & Textile Machy., Inc., Pawtucket, R. I.

**BAKERS—Rod and Wire**
Carl-Mayer Corp, The, Cleveland, Ohio.
Drying Systems, Inc., Chicago, Ill.
Morgan Construction Co., Worcester, Mass.
Ross, J. O., Engr. Corp., New York, N. Y.

**BAR STOCK—Stainless Steel**
American Steel & Wire Company, Cleveland, Chicago, New York.
Columbia Steel Co., San Francisco, Calif.
U. S. Steel Export Company, New York, N. Y.

**BOBBINS—Braider & Wire Weaving**
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Wire & Textile Machinery, Inc., Pawtucket, R. I.

**BORAX—Wire Drawing**
Pacific Coast Borax Corp., New York, N. Y.

**BORON CARBIDE—**
Norton Co., Worcester, Mass.

**BRAKES—Pneumatic**
Entwistle, Jas. L. Co., Pawtucket, R. I.

**CABLE LACQUERING OVENS—**
Industrial Ovens, Inc., Cleveland, O.

**CARRIERS—Braider, High Speed**
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
New England Butt Co., Providence, R. I.
Wire & Textile Machinery, Inc., Pawtucket, R. I.

**CASTINGS—Wire Mill**
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.

**CEMENTS—Acid Proof**
Ceilcote Company, Cleveland, Ohio.

**CEMENTS—Refractory**
Norton Co., Worcester, Mass.

**CHEMICALS—Cleaning**
(See Cleaners—Metal)

**CLEANERS—Metal**
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Phila., Pa.
Du Pont de Nemours, E. I. & Co., Electrochemical Dept., Wilmington, Del.
Houghton, E. F., Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Metal & Thermit Corp., New York, N. Y.
Oakite Products, Inc., New York, N. Y.
The Parkin Chemical Company, Pittsburgh, Pa.
Standard Industrial Compounds Co., Inc., Chicago, Ill.

**CLEANING & PICKLING EQUIP.—**
Ceilcote Company, Cleveland, Ohio.
Chemsteel Construction Co., Pittsburgh, Pa.
Cleveland Tramrail Div., of the Cleveland Crane & Engineering Co., Wickliffe, O.
Haveg Corp., Newark, Del.
Heil Process Equipment Corp., Cleveland, Ohio.
Holden, A. F., Company, The, Detroit, Mich.
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.
Youngstown Welding & Engineering Co., Youngstown, Ohio

**CLOTH—WIRE, All Metals**
Roebling's, John A. Sons, Co., Trenton, N. J.
Wickwire Bros., Cortland, N. Y.

**COATING COMPOUNDS—**
Apex Alkali Products Co., Philadelphia, Pa.
Houghton, E. F. & Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Inc., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Standard Industrial Compounds Co., Inc., Chicago, Ill.

**COILERS—Sheet, Strip and Wire**
Entwistle, Jas. L. Co., Pawtucket, R. I.
Morgan Construction Co., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Wean Equipment Corp., Cleveland, O.

**COLD HEADERS—**
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

**COMPOUNDS—Coppering**
American Chemical Paint Co., Ambler, Pa.
Techema Co., The, Toronto, Canada

**COMPOUNDS—Diamond**
Eastern Carbide Corp., New Rochelle, N. Y.
Elgin National Watch Company, Industrial Products Division, Elgin, Ill.
Hyprez Division, Engis Equipment Co., Chicago, Ill.
Magnus Chemical Co., Garwood, N. J.

**COMPOUNDS—For Improving Drawing and Extrusion**
American Chemical Paint Co., Ambler, Pa.

**COMPOUNDS—Metal Finishing**
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Du Pont de Nemours, E. I. & Co., Electrochemical Dept., Wilmington, Del.
Metal & Thermit Corp., New York, N. Y.

**COMPOUNDS—Phosphate Coating**
American Chemical Paint Co., Ambler, Pa.

**COMPOUNDS—Rust Preventing**
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Houghton, E. F. & Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Oakite Products, Inc., New York, N. Y.

**COMPOUNDS—Rust Removing**
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Houghton, E. F. & Co., Philadelphia, Pa.
Oakite Products, Inc., New York, N. Y.
Standard Industrial Compounds Co., Inc., Chicago, Ill.

**COMPOUNDS—Wire Drawing**
Apex Alkali Products Co., Philadelphia, Pa.
Bick, Hans C., Inc., Reading, Pa.
Houghton, E. F. & Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H. Co., Inc., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Pacific Coast Borax Corp., New York, N. Y.
Standard Industrial Compounds Co., Inc., Chicago, Ill.
Swift & Company, Chicago, Ill.

**CONDUCTORS—Flexible, Electrical**
Montgomery Co., The, Windsor Locks, Conn.

**COPHOLDERS—Steel**
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Wire & Textile Machinery, Inc., Pawtucket, R. I.

**CORDS—Electrical, Tinsel Conductor**
Montgomery Co., The, Windsor Locks, Conn.

**CORROSION PREVENTIVES**
Angier Corporation, The, Framingham, Mass.

**CRANES—Wire Mill**
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

**CUTTING TOOLS—Carbide**
Carboloy Co., Inc., Detroit, Mich.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth-Sterling Steel & Carbide Corp., McKeesport, Pa.
Metal Carbides Corporation, Youngstown, Ohio.
Rusch Wire Die Corp., Croton-on-the-Hudson, New York.
Vascoloy-Ramet Corp., North Chicago, Ill.

**CUTTING TOOLS—Wire**
Porter, H. K., Inc., Everett, Mass.

**DIAMONDS—Industrial**
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Diamond Tool Research Co., New York, N. Y.
Rusch Wire Die Corp., Croton-on-the-Hudson, N. Y.
Wayne Wire Die Co., Hillside, N. J.

**DIAMOND POWDERS—**
Diamond Tool Research Co., New York, N. Y.
Eastern Carbide Corp., New Rochelle, N. Y.
Elgin National Watch Co., Industrial Products Division, Elgin, Ill.
Hoosier Wire Die, Inc., Ft. Wayne, Ind.
Hyprez Division, Engis Equipment Co., Chicago, Ill.
Indiana Wire Die Co., Ft. Wayne, Ind.
National Research Company, St. Claire Shores, Mich.
New England Wire Die Co., Worcester, Mass.
Rusch Wire Die Corp., Croton-on-the-Hudson, N. Y.
Wayne Wire Die Co., Hillside, N. J.

**DIAMOND POWDER RECLAIMING**
Diamond Tool Research Co., New York, N. Y.
National Research Company, St. Claire Shores, Mich.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.

**DIAMOND TOOLS—**
Carboloy Co., Inc., Detroit, Mich.
Diamond Tool Research Co., New York, N. Y.
Indiana Wire Die Co., Ft. Wayne, Ind.
Metal Carbides Corporation, Youngstown, Ohio
Rusch Wire Die Corp., Croton-on-the-Hudson, N. Y.
Wayne Wire Die Co., Hillside, N. J.

**DIES—Carbide**
(See Dies—Tungsten Carbide)

**DIES—Cold Heading**
American Carbide Die Company, Union City, N. J.
Carboloy Co., Inc., Detroit, Mich.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth-Sterling Steel & Carbide Corp., McKeesport, Pa.
Indiana Wire Die Co., Ft. Wayne, Ind.
Metal Carbides Corporation, Youngstown, Ohio.
Vascoloy-Ramet Corp., No. Chicago, Ill.

**DIES—Diamond**
Ajax Industrial Supplies, Inc., Fort Wayne, Ind.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J., New York, N. Y.
Cochaud Wire Die Corp., New York, N. Y.
Ft. Wayne Wire Die, Inc., Fort Wayne, Ind.
Hoosier Wire Die, Inc., Ft. Wayne, Ind.
Indiana Wire Die Co., Ft. Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
New England Wire Die Co., Worcester, Mass.
North American Philips Co., Inc., New York, N. Y.
Rusch Wire Die Corp., Croton-on-the-Hudson, N. Y.
Wayne Wire Die Co., Hillside, N. J.

**DIES—Extrusion**
American Carbide Die Company, Union City, N. J.
Carboloy Co., Inc., Detroit, Mich.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
Hartley Tool & Die Co., Thomaston, Conn.
Metal Carbides Corporation, Youngstown, Ohio.
Murex, Ltd., Rainham, England.
Rusch Wire Die Corp., Croton-on-the-Hudson, N. Y.
Wayne Wire Die Co., Hillside, N. J.

**DIES—Eyelet**
American Carbide Die Company, Union City, N. J.
Eastern Carbide Corp., New Rochelle, N. Y.
Hartley Tool & Die Co., Thomaston, Conn.
Kelly Wire Die Corp., New York, N. Y.
Rusch Wire Die Corp., Croton-on-the-Hudson, N. Y.

**DIES—Pointing**
Sjogren Tool and Machine Co., Auburn, Mass.

**DIES—Repairs & Re-Cutting**
American Carbide Die Company, Union City, N. J.
Ajax Industrial Supplies, Inc., Fort Wayne, Ind.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J., New York, N. Y.
Carboloy Co., Detroit, Mich.
Cochaud Wire Die Corp., New York, N. Y.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth-Sterling Steel & Carbide Corp., McKeesport, Pa.
Ft. Wayne Wire Die, Inc., Fort Wayne, Ind.
Hartley Tool & Die Co., Thomaston, Conn.
Hoosier Wire Die, Inc., Ft. Wayne, Ind.
Indiana Wire Die Co., Ft. Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corporation, Youngstown, Ohio.
New England Wire Die Co., Worcester, Mass.
North American Philips Co., Inc., New York, N. Y.
Rusch Wire Die Corp., Croton-on-the-Hudson, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Wayne Wire Die Co., Hillside, N. J.

# WHERE TO BUY, Continued

**DIES—Special Shapes, Etc.**
American Carbide Die Company, Union City, N. J.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth-Sterling Steel & Carbide Corp., McKeesport, Pa.
Hartley Tool & Die Co., Thomaston, Conn.
Indiana Wire Die Co., Ft. Wayne, Ind.
Murex, Ltd., Rainham, England.
Rusch Wire Die Corp., Croton-on-the-Hudson, N. Y.

**DIES—Swaging**
Murex, Ltd., Rainham, England.
Sjogren Tool and Machine Co., Inc., Auburn, Mass.

**DIES—Tantalum Carbide**
American Carbide Die Company, Union City, N. J.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Carboloy Co., Inc., Detroit, Mich.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth-Sterling Steel & Carbide Corp., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corporation, Youngstown, Ohio.
Rusch Wire Die Corp., Croton-on-the-Hudson, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.

**DIES—Tube Drawing**
American Carbide Die Company, Union City, N. J.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Carboloy Co., Inc., Detroit, Mich.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth-Sterling Steel & Carbide Corp., McKeesport, Pa.
Hartley Tool & Die Co., Thomaston, Conn.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
Murex, Ltd., Rainham, England.
Rusch Wire Die Corp., Croton-on-the-Hudson, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.

**DIES—Tungsten Carbide**
American Carbide Die Company, Union City, N. J.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Carboloy Co., Inc., Detroit, Mich.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth-Sterling Steel & Carbide Corp., McKeesport, Pa.
Hartley Tool & Die Co., Thomaston, Conn.
Hoosier Wire Die, Inc., Ft. Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
Murex, Ltd., Rainham, England.
Rusch Wire Die Corp., Croton-on-the-Hudson, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Wayne Wire Die Co., Hillside, N. J.

**DRAW BENCHES—**
(See MACHINERY—Draw Benches)

**DRUMS—Flange Steel**
Hubbard Spool Company, Chicago, Ill.
Niles Steel Products Division, Republic Steel Corporation, Niles, Ohio

**DRUMS—Vulcanizing**
Mossberg Pressed Steel Corp., Attleboro, Mass.
Watson Machine Co., The, Paterson, N. J.

**DRYING EQUIPMENT—**
Carl-Mayer Corp., The, Cleveland, Ohio.
Drying Systems, Inc., Chicago, Ill.
Industrial Ovens, Inc., Cleveland, Ohio.
Rockwell, W. S. Co., Fairfield, Conn.
Ross, J. O., Engineering Corp., New York, N. Y.

**ENGINEERS—Consulting**
**Copper**—Leonard D. Walde, North Plainfield, N. J.
**Metal Fatigue**—Fatigue of Materials Laboratory, Princeton, N. J.
**Spring Design**—Carlson Co., The, New York, N. Y.
**Wire Mill**—Lewis, Kenneth B., Worcester, Mass.

**EQUIPMENT—Insulation Testing**
Davis, R. L., Elec. Co., Wallingford, Conn.
Entwistle, James L., Co., Pawtucket, R. I.

**EYELETS—Brass or Zinc**
Platt Bros. & Co., The, Waterbury, Conn.

**FENCING & FENCES—Wire**
Interlocking Fence Co., Morton, Ill.

**FLUXES—Soldering**
American Chemical Paint Co., Ambler, Pa.

**FOAM PRODUCING COMPOUNDS—**
American Chemical Paint Co., Ambler, Pa.
Parkin Chemical Company, The, Pittsburgh, Pa.

**FRICTION PAY-OFF STANDS—**
Industrial Ovens, Inc., Cleveland, Ohio.

**FURNACES—Annealing**
Ajax Electric Co., Inc., Philadelphia, Pa.
Carl-Mayer Corp., The, Cleveland, Ohio.
Drying Systems, Inc., Chicago, Ill.
Electric Furnace Co., Salem, Ohio.
Holden, A. F., Co., The, Detroit, Mich.
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio.
Trauwood Engr. Co., Cleveland, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

**FURNACES—Automatic**
Electric Furnace Co., Salem, Ohio.
Surface Combustion Corp., Toledo, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

**FURNACES—Brazing**
Electric Furnace Co., Salem, Ohio.
Rockwell, W. S. Co., Fairfield, Conn.

**FURNACES—Bright Annealing**
Electric Furnace Co., Salem, Ohio.
Michigan Oven Co., Detroit, Mich.
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

**FURNACES—Electric**
Electric Furnace Co., Salem, Ohio.
Rockwell, W. S. Co., Fairfield, Conn.
Trauwood Engineering Co., The, Cleveland, Ohio.

**FURNACES—Galvanizing Equipment**
Ajax Electric Co., Inc., Philadelphia, Pa.
Electric Furnace Co., Salem, Ohio.
Holden, A. F., Co., The, Detroit, Mich.
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio.
Trauwood Engineering Co., The, Cleveland, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

**FURNACES—Hard'ing & Temp'ing**
Ajax Electric Co., Inc., Philadelphia, Pa.
Drying Systems, Inc., Chicago, Ill.
Electric Furnace Co., Salem, Ohio.
Holden, A. F., Co., The, Detroit, Mich.
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio.
Trauwood Engineering Co., The, Cleveland, Ohio.

**FURNACES—Lead Melting**
Electric Furnace Co., Salem, Ohio.
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio.

**FURNACES—Non-Oxidizing**
Ajax Electric Co., Inc., Philadelphia, Pa.
Electric Furnace Co., Salem, Ohio.
Holden, A. F., Co., The, Detroit, Mich.
Surface Combustion Corp., Toledo, Ohio.

**FURNACES—Normalizing**
Ajax Electric Co., Inc., Philadelphia, Pa.
Carl-Mayer Corp., The, Clevel nd, Ohio.
Drying Systems, Inc., Chicago, Ill.
Electric Furnace Co., Salem, Ohio.
Holden, A. F., Co., The, Detroit, Mich.
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio.

**FURNACES—Pot (oil, gas, electric)**
Ajax Electric Co., Inc., Philadelphia, Pa.
Holden, A. F., Co., The, Detroit, Mich.

**FURNACES—Resistance Heating, Strand**
Trauwood Engineering Co., The, Cleveland, Ohio.

**FURNACES—Salt Bath**
Ajax Electric Co., Inc., Philadelphia, Pa.
Electric Furnace Co., Salem, Ohio.
Holden, A. F., Co., The, Detroit, Mich.
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio.

**FURNACES—Wire, Strip & Sheet**
Carl-Mayer Corp., The, Cleveland, Ohio.
Eisler Engineering Co., Newark, N. J.
Electric Furnace Co., Salem, Ohio.
Michigan Oven Co., Detroit, Mich.
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio.
Trauwood Engineering Co., The, Cleveland, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

**GALVANIZING EQUIPMENT—**
Steel Equipment Co., Cleveland, Ohio.
Wean Equipment Corp., Cleveland, Ohio.

**GRINDERS—Roll**
Norton Co., The, Worcester, Mass.

**HAMMERS—Swaging**
Sjogren Tool and Machine Co., Auburn, Mass.

**HOOKS—Pickling & Liming**
Bronze Die Casting Co., Pittsburgh, Pa.
Youngstown Welding & Engineering Co., Youngstown, Ohio.

**HOISTS—Electric Travelling**
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, Ohio.

**IMPREGNATING MATERIALS—**
Standard Varnish Works, New York-Linden, N. J.-Chicago

**INHIBITORS—Pickling**
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Du Pont de Nemours, E. I. & Co., Electrochemical Dept., Wilmington, Del.
Houghton, E. F. & Co., Philadelphia, Pa.
Oakite Products, Inc., New York, N. Y.
Parkin Chemical Company, The, Pittsburgh, Pa.

**INSULATING LACQUERING SYSTEMS—Continuous**
American Insulating Machine Co., Phila., Pa.
Industrial Ovens, Inc., Cleveland, Ohio.

**INSULATING MATERIALS—**
Du Pont de Nemours, E. I., Co., Wilmington, Del.
Glass Fibers, Inc., Waterville, Ohio.
Merrimac Paper Co., New York, N. Y.
New England Lacquer Co., E. Providence, R. I.
Owens Corning Fiberglas Corp., Toledo, O.
Standard Varnish Works, New York-Linden, N. J.-Chicago
Twitchell, E. W., Philadelphia, Pa.

**INSULATING MATERIALS—Paper—For Electric Wire Cable.**
Merrimac Paper Co., New York, N. Y.
Twitchell, E. W., Philadelphia, Pa.

**LACQUERS—For Electric Wire**
New England Lacquer Co., E. Providence, R. I.
Standard Varnish Works, New York-Linden, N. J.-Chicago

**LAME—LAHN—**
Montgomery Co., The, Windsor Locks, Conn.

**LATHES—Die Reaming**
Carboloy Co., Inc., Detroit, Mich.
Roos, Tool & Mfg. Co., Montclair, N. J.

**LIME—**
Warner Co., Philadelphia and Bellefonte, Pa.

**LININGS—Acid and Alkali Proof**
Haveg Corp., Newark, Del.
Heil Process Equipment Corp., Cleveland, Ohio.

**LUBRICANTS — For Metal Cutting, Stamping and Drawing**
Apex Alkali Products Co., Philadelphia, Pa.
Houghton, E. F. & Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Inc., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Standard Industrial Compounds Co., Inc., Chicago, Ill.

**LUBRICANTS—Wire Drawing**
(See Compounds—Wire Drawing)

**LUBRICANTS—Wire Rope**
Swift & Co., Chicago, Ill.

**MACHINERY—Armoring (Cable, Wire Hose)**
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

**MACHINERY—Barbed Wire**
Glader Machine Works, Chicago, Ill.
Wean Engineering Co., Cleveland, Ohio.

**MACHINERY—Bead Wrapping**
Terkelsen Machine Co., Boston, Mass.

**MACHINERY—Bolts & Rivets**
Meyer, Roth & Pastor Machinenfabrik Koln-Radderberg, Germany

**MACHINERY—Braiding**
Fidelity Machine Co., Inc., Philadelphia, Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.

# WHERE TO BUY, Continued

New England Butt Co., Providence, R. I.
Wire & Textile Mach'y, Inc., Pawtucket, R. I.

**MACHINERY—Brazing**
Eisler Engineering Co., Newark, N. J.
Syncro Machine Co., Perth Amboy, N. J.

**MACHINERY—Bunching**
American Insulating Mach'y Co., Phila., Pa.
Federal Manufacturing Co., Wallingford, Conn.
Haskell-Dawes Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wire & Textile Machinery, Inc., Pawtucket, R. I.

**MACHINERY—Bundling, Scrap**
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

**MACHINERY—Cable, Electric**
American Insulating Mach'y Co., Phila., Pa.
Fidelity Machine Co., Inc., Philadelphia, Pa.
Haskell-Dawes Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

**MACHINERY—Cable, Rope Closing**
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

**MACHINERY—Coilers**
Boyd & Sons Manufacturing Co., Phila., Pa.
Eisler Engineering Co., Newark, N. J.
Entwistle, Jas. L. Co., Pawtucket, R. I.
Morgan Construction Co., Worcester, Mass.
National Machinery Exchange (used), New York, N. Y.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.
Watson Machine Co., Paterson, N. J.
Wean Equipment Corp., Cleveland, Ohio.
Wire & Textile Machinery, Inc., Pawtucket, R. I.

**MACHINERY—Cold Heading**
(See Cold Headers)

**MACHINERY—Copper Wire Drawing and Rolling**
Aetna-Standard Engineering Co., Youngstown, Ohio.
American Insulating Mach'y Co., Phila., Pa.
National Mach'y Exch. (Used), New York, N. Y.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

**MACHINERY—Covering Wire**
American Insulating Mach'y Co., Phila., Pa.
Fidelity Machine Co., Inc., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Royle, John & Sons, Paterson, N. J.
Standard Machinery Co., Mystic, Conn.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

**MACHINERY—Cutting**
Eisler Engineering Co., Newark, N. J.
Lewis Machine Co., The, Cleveland, Ohio.
Mettler Machine Tool, Inc., New Haven, Conn.
National Mach'y Exch. (Used) New York, N. Y.
Porter, H. K., Inc., Everett, Mass.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Wean Equipment Corp., Cleveland, Ohio.

**MACHINERY—Die Making**
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel & Carbide Corp., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Roos Tool & Mfg. Co., Montclair, N. J.
Wayne Wire Die Co., Hillside, N. J.
Wickman, A. C., Ltd., Coventry, England.

**MACHINERY—Draw Benches**
Aetna-Standard Engineering Co., Youngstown, Ohio.
Morgan Construction Co., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, Ohio.

**MACHINERY—Edging**
Wean Equipment Corp., Cleveland, Ohio.

**MACHINERY—Enameling**
American Insulating Mach'y Co., Phila., Pa.
Industrial Ovens, Inc., Cleveland, Ohio.
Michigan Oven Co., Detroit, Mich.
Syncro Machine Co., Perth Amboy, N. J.

**MACHINERY—Extruding**
Royle, John, & Sons, Paterson, N. J.
Standard Machinery Co., Mystic, Conn.
Wire & Textile Machinery, Inc., Pawtucket, R. I.

**MACHINERY—Fence**
Glader, Wm., Machine Works, Chicago, Ill.
Interlocking Fence Co., Morton, Ill.
Wean Equipment Corp., Cleveland, Ohio.

**MACHINERY—Filament Coil Winding**
Eisler Engineering Co., Newark, N. J.

**MACHINERY—Flat Wire**
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Wean Equipment Corp., Cleveland, Ohio.

**MACHINERY—Galvanizing**
(See Galvanizing Equipment)

**MACHINERY—Galvanizing Wire**
Sleeper & Hartley, Inc., Worcester, Mass.
Steel Equipment Co., Cleveland, Ohio
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, O.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

**MACHINERY—Gang Winders**
Entwistle, Jas. L. Co., Pawtucket, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

**MACHINERY—Grinding**
Norton Co., The, Worcester, Mass.

**MACHINERY—Insulating**
American Insulating Mach'y Co., Phila., Pa.
Fidelity Machine Co., Inc., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Ets. Pourtier Frères, Romainville, France
Royle, John & Sons, Paterson, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

**MACHINERY—Knitting**
Fidelity Machine Co., Inc., Philadelphia, Pa.

**MACHINERY—Lock Washer**
Sleeper & Hartley, Inc., Worcester, Mass.

**MACHINERY—Looms, Wire Weaving**
Interlocking Fence Co., Morton, Ill.

**MACHINERY—Magnet Wire**
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.

**MACHINERY—Material Handling**
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, O.

**MACHINERY—Measuring Wire & Cable**
Durant Mfg. Co., Milwaukee, Wis.
Entwistle, Jas. L. Co., Pawtucket, R. I.
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

**MACHINERY—Nail and Tack**
Glader, Wm., Machine Works, Chicago, Ill.
Meyer, Roth & Pastor Machinenfabrik Koln-Radderberg, Germany
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Wean Equipment Corp., Cleveland, Ohio.

**MACHINERY—Panning**
American Insulating Mach'y Co., Phila., Pa.
Syncro Machine Co., Perth Amboy, N. J.
Wire & Textile Machinery, Inc., Pawtucket, R.I.

**MACHINERY—Pickling**
Chemsteel Construction Co., Pittsburgh, Pa.
Youngstown Welding & Engineering Co., Youngstown, Ohio

**MACHINERY—Pin Making**
Meyer, Roth & Pastor Machinenfabrik Koln-Radderberg, Germany

**MACHINERY—Pointing**
Aetna-Standard Engineering Co., Youngstown, Ohio
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch. (Used), New York, N. Y.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Wean Equipment Corp., Cleveland, Ohio.

**MACHINERY—Poultry Wire Fencing**
Interlocking Fence Co., Morton, Ill.

**MACHINERY—Rod Mill**
Morgan Construction Co., Worcester, Mass.
Wean Equipment Corp., Cleveland, Ohio.

**MACHINERY—Rolling Mill**
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch. (Used), New York, N. Y.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Wean Equipment Corp., Cleveland, Ohio.

**MACHINERY—Rubber Insulating**
Royle, John & Sons, Paterson, N. J.
Standard Machinery Co., Mystic, Conn.
Wire & Textile Machinery, Inc., Pawtucket, R.I.

**MACHINERY—Rubber Tubing and Straining**
New England Butt Co., Providence, R. I.
Royle, John & Sons, Paterson, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Machinery Co., Mystic, Conn.
Wire & Textile Machinery, Inc., Pawtucket, R.I.

**MACHINERY—Screw Wire**
Sleeper & Hartley, Inc., Worcester, Mass.

**MACHINERY—Special**
American Insulating Mach'y Co., Phila., Pa.
Davis, R. L. Electric Co., Wallingford, Conn.
Emory, Robert J., Co., Newark, N. J.
Entwistle, Jas. L. Co., Pawtucket, R. I.
New England Butt Co., Providence, R. I.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sjogren Tool and Machine Co., Auburn, Mass.
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Machinery Co., Mystic, Conn.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wean Equipment Corp., Cleveland, Ohio.

**MACHINERY—Spooling**
American Insulating Mach'y Co., Phila., Pa.
Boyd & Sons Manufacturing Co., Phila., Pa.
Davis, R. L. Electric Co., Wallingford, Conn.
Eisler Engineering Co., Newark, N. J.
Emory, Robert J., Co., Newark, N. J.
Entwistle, Jas. L. Co., Pawtucket, R. I.
Fidelity Machine Co., Inc., Philadelphia, Pa.
National Mach'y Exch. (Used), New York, N. Y.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Steel Equipment Co., Cleveland, Ohio.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Watson Machine Co., Paterson, N. J.
Wean Equipment Corp., Cleveland, Ohio.
Wire & Textile Machinery, Inc., Pawtucket, R.I.

**MACHINERY—Spring Making**
Carlson Company, The, New York, N. Y.
Lundahl Corp., Hartford, Conn.
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Wells, Frank L., Co., Kenosha, Wisc.

**MACHINERY—Staple**
Sleeper & Hartley, Inc., Worcester, Mass.

**MACHINERY—Straightening**
Lewis Machine Co., The, Cleveland, Ohio.
Mettler Machine Tool Co., New Haven, Conn.
National Mach'y Exch. (Used), New York, N. Y.
Norsholm Industries, Rochester, Michigan
Sleeper & Hartley, Inc., Worcester, Mass.
Wean Equipment Corp., Cleveland, Ohio.
Wells, Frank L., Co., Kenosha, Wisc.

**MACHINERY—Stranding**
Haskell-Dawes Machine Co., Philadelphia, Pa.
Hughesville Machine & Tool Co., Hughesville, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

**MACHINERY—Strip Forming**
Wickman, A. C., Ltd., Coventry, England

**MACHINERY—Strip Steel**
Aetna-Standard Engineering Co., Youngstown, Ohio
Steel Equipment Co., Cleveland, Ohio.
Wean Equipment Corp., Cleveland, Ohio.

**MACHINERY—Swaging**
National Mach'y Exch. (Used), New York, N. Y
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

**MACHINERY—Taping**
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence R. I.
Ets. Pourtier Frères, Romainville, France
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wire & Textile Machinery, Inc., Pawtucket, R.I.

# WHERE TO BUY, Continued

**MACHINERY—Testing Physical**
Lundahl Corporation, Hartford, Conn.
Scott Testers, Inc., Providenec, R. I.

**MACHINERY—Testing Equipment—Sparkers**
Davis, R. L. Elec. Co., Wallingford, Conn.
Entwistle, Jas. L. Co., Pawtucket, R. I.
Wire & Textile Machinery, Inc., Pawtucket, R.I. (used)

**MACHINERY—Tinning Wire**
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Steel Equipment Co., Cleveland, Ohio.
Syncro Machine Co., Perth Amboy, N. J.
Wean Equipment Corp., Cleveland, Ohio.

**MACHINERY—Tinsel Rolling Mills**
American Insulating Mach'y Co., Phila., Pa.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.

**MACHINERY—Trolley Wire**
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

**MACHINERY—Tube Mill**
Marshall-Richards Machine Company, Inc., Trenton, N. J.

**MACHINERY—Twinning**
(See Mach.—Bunching)

**MACHINERY—Twisters, Wire**
Federal Manufacturing Co., Wallingford, Conn.

**MACHINERY—Welding Wire**
Eisler Engineering Co., Newark, N. J.
Micro Products Co., Chicago, Ill.
Syncro Machine Co., Perth Amboy, N. J.

**MACHINERY—Winding**
American Insulating Mach'y Co., Phila., Pa.
Davis, R. L. Electric Co., Wallingford, Conn.
Eisler Engineering Co., Newark, N. J.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Mill Supply, Pawtucket, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

**MACHINERY—Winding Wire**
Federal Manufacturing Co., Wallingford, Conn.
Standard Mill Supply, Pawtucket, R. I.

**MACHINERY—Wind-up (Constant Tension, Variable Speed)**
Aetna-Standard Engineering Co., Youngstown, Ohio
Davis, R. L. Electric Co., Wallingford, Conn.
Federal Manufacturing Co., Wallingford, Conn.
Industrial Ovens, Inc., Cleveland, Ohio
Marshall-Richards Machine Company, Inc., Trenton, N. J.
Standard Machine Co., Mystic, Conn.
Watson Machine Co., Paterson, N. J.

**MACHINERY—Wire Bending**
Eisler Engineering Co., Newark, N. J.
Kilmer, M. D., & Co., Cleveland, Ohio.

**MACHINERY—Wire Drawing**
Aetna-Standard Engineering Co., Youngstown, Ohio
American Insulating Mach'y Co., Phila., Pa.
Kurt Orban Co., Inc., New York, N. Y.
Marshall-Richards Machine Company, Inc., Trenton, N. J.
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch. (Used), New York, N. Y.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Steel Equipment Co., Cleveland, Ohio.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Wean Equipment Corp., Cleveland, Ohio.

**MACHINERY—Wire Forming**
Kilmer, M. D. & Co., Cleveland, Ohio.
Meyer, Roth & Pastor Machinenfabrik Koln-Radderberg, Germany
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.

**MACHINERY—Wire Rope**
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

**MACHINERY—Wood Screw**
National Mach'y Exch. (Used), New York, N. Y.

**MACHINERY—Wrapping Straight Lengths and Tubing**
Angier Corporation, The, Framingham, Mass.
Terkelsen Machine Co., Boston, Mass.

**MACHINERY—Wrapping Wire Coils**
Angier Corporation, The, Framingham, Mass.
Terkelsen Machine Co., Boston, Mass.

**MATERIAL HANDLING EQUIPMENT**
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, O.

**MILLS—Tandem, Rolling & Edging**
Torrington Mfg. Co., Torrington, Conn.
Wean Equipment Co., Cleveland, Ohio.

**NAILS—Wire**
American Steel & Wire Co., Cleveland, Chicago, New York.
Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Co., San Francisco, Calif.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Roebling, John A. Sons Co., Trenton, N. J.
U. S. Steel Export Co., New York, N. Y.
Wickwire Brothers, Inc, Cortland, N. Y.

**OVENS—Cable Lacquering**
American Insulating Mach'y Co., Phila., Pa.
Carl-Mayer Corp., The, Cleveland, Ohio.
Industrial Ovens, Inc., Cleveland, Ohio.
Michigan Oven Co., Detroit, Mich.

**OVENS—Dehydrogenizing**
Industrial Ovens, Inc., Cleveland, Ohio.

**OVENS—Industrial**
Drying Systems, Inc., Chicago, Ill.
Industrial Ovens, Inc., Cleveland, Ohio.
Michigan Oven Co., Detroit, Mich.
Ross, J. O., Engr. Corp., New York, N. Y.

**OVENS—Rod Bakers**
Carl-Mayer Corp., The, Cleveland, Ohio.
Drying Systems, Inc., Chicago, Ill.
Michigan Oven Co., Detroit, Mich.
Ross, J. O., Engr. Corp., New York, N. Y.

**OVENS—Welding Rod Coating**
Carl-Mayer Corp., The, Cleveland, Ohio.
Drying Systems, Inc., Chicago, Ill.
Industrial Ovens, Inc., Cleveland, Ohio.
Ross, J. O., Engr. Corp., New York, N. Y.

**PAINT—Acid Proof**
Ceilcote Company, Cleveland, Ohio.
Standard Varnish Works, New York—Linden, N. J. —Chicago

**PAINT BONDING CHEMICALS—**
American Chemical Paint Co., Ambler, Pa.

**PAINTS—Heat Resisting**
American Chemical Paint Co., Ambler, Pa.
Standard Varnish Works, New York—Liden, N. J. —Chicago

**PANS—Vulcanizing**
Mossberg Pressed Steel Corp., Attleboro, Mass.

**PAPER—Creped Wrapping**
Angier Corporation, The, Framingham, Mass.
Crepe-Kraft Company, The, Division National Waterproof Papers, Inc., Newark, N. J.
Terkelsen Machine Co., Boston, Mass.

**PAPER—For Coil Wrapping and Corrosion Prevention**
Angier Corporation, The, Framingham, Mass.
Crepe-Kraft Company, The, Division National Waterproof Papers, Inc., Newark, N. J.
Terkelsen Machine Co., Boston, Mass.

**PATENT ATTORNEYS—**
Lancaster, Allwine & Rommel, Washington, D. C.

**PAY-OUT SYSTEMS—**
(See Wind-up and Unwind Systems)

**PHOSPHATE COATING CHEMICALS**
American Chemical Paint Co., Ambler, Pa.
Oakite Products, Inc., New York, N. Y.

**PICKLING COMPOUNDS—**
See (Inhibitors—Pickling)

**PICKLING—Hooks, etc. Acid Resisting**
Bronze Die Casting Co., Pittsburgh, Pa.
Youngstown Welding & Engineering Co., Youngstown, Ohio.

**PICKLING TANK LININGS—**
Chemsteel Construction Co., Pittsburgh, Pa.
Haveg Corp., Newark, Del.
Heil Process Equipment Corp., Cleveland, Ohio.

**PIPES & FITTINGS—Acid Resistant**
Haveg Corp., Newark, Del.
Heil Process Equipment Corp., Cleveland, Ohio.

**PLASTIC TESTERS—**
Scott Testers, Inc., Providence, R. I.

**PNEUMATIC CYLINDERS—**
Entwistle, Jas. L. Co., Pawtucket, R. I.

**POTS—Lacquer**
Industrial Ovens, Inc., Cleveland, Ohio.

**PRESSES—Hydraulic and Mechanical**
Standard Machinery Co., Mystic, Conn.

**PULLERS AND GRIPS—For Wire**
Morgan Construction Co., Worcester, Mass.
Scudder, E. J. Fdry & Mach. Co., Trenton, N. J.
Sjogren Tool and Machine Co., Auburn, Mass.
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, Ohio.

**REEL AND TENSION STANDS—**
Davis, R. L. Elec. Co., Wallingford, Conn.
Entwistle, Jas. L. Co., Pawtucket, R. I.
Industrial Ovens, Inc., Cleveland, Ohio.
Roll-a-Reel, Cincinnati, Ohio.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

**REEL CRUTCHES—**
Roll-a-Reel, Cincinnati, Ohio
Watson Machine Co., Paterson, N. J.

**REELS & SPOOLS—Drawn Aluminum Alloy**
Acrometal Products, Inc., Minneapolis, Minn.
Hubbard Spool Co., Chicago, Ill.

**REELS & SPOOLS—Annealing and Stranding**
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp. Niles, Ohio.

**REELS & SPOOLS—Collapsible**
Entwistle, Jas. L. Co., Pawtucket, R. I.

**REELS & SPOOLS—Plastic**
Hubbard Spool Co., Chicago, Ill.

**REELS & SPOOLS—Steel**
Apco Mossberg Co., Attleboro, Mass.
Clark, J. L., Mfg. Co., Rockford, Ill.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Co., Chicago, Ill.
Mason Can Company, East Providence, R. I.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp. Niles, Ohio.

**REELS AND SPOOLS—Shipping and Shop**
Acrometal Products, Inc., Minneapolis, Minn.
American Woodworking Co., Chicago, Ill.
Apco Mossberg Co., Attleboro, Mass.
Bridge Mfg. Co., Inc., The, Hazardville, Conn.
Clark, J. L., Mfg. Co., Rockford, Ill.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Co., Chicago, Ill.
Mason Can Company, East Providence, R. I.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp. Niles, Ohio.
Proctor Reels, Proctorville, Vt.

**REELS & SPOOLS—Wooden**
Acrometal Products, Inc., Minneapolis, Minn.
American Woodworking Co., Chicago, Ill.
Bridge Mfg. Co., Inc., The, Hazardville, Conn.
Durkee Mfg. Co., Pine River, Minn.
Proctor Reels, Proctorville, Vt.

**REELS—Metal Bound**
Durkee Mfg. Co., Pine River, Minn.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Co., Chicago, Ill.

**REELS—Pay-off**
Norsholm Industries, Rochester, Mich.

**REELS—Takeoff**
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Bridge Mfg. Co., The, Hazardville, Conn.
Clark, J. L., Mfg. Co., Rockford, Ill.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp. Niles, Ohio.
Proctor Reels, Proctorville, Vt.

**REELS—Vulcanizing & Impregnating**
Apco Mossberg Co., Attleboro, Mass.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp. Niles, Ohio.

# WHERE TO BUY, Continued

**REELS—Wire Drawing**
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp. Niles, Ohio.

**REELS—Wire Mill**
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Bridge Mfg. Co., The, Hazardville, Conn.
Durkee Mfg. Co., Pine River, Minn.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Co., Chicago, Ill.
Mason Can Company, East Providence, R. I.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp. Niles, Ohio.
Proctor Reels, Proctorville, Vt.

**REFRACTORIES—High Temperature**
Norton Company, Worcester, Mass.

**RESISTANCE HEATING—Annealing Patenting, Etc.**
Trauwood Engr. Co., Cleveland, Ohio.

**ROD BAKERS—**
(See Ovens—Rod Bakers)

**RODS—Stainless Steel**
American Steel & Wire Co., Cleveland, Ohio.

**RODS—Wire—Non-Ferrous**
Platt Bros. & Co., The, Waterbury, Conn.

**RODS—Wire, Steel**
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Indiana.
Keystone Steel & Wire Co., Peoria, Ill.
Roebling's John A., Sons Co., Trenton, N. J.
Youngstown Sheet & Tube Co., Youngstown, O.

**ROPE—Wire**
American Steel & Wire Company, Cleveland, Chicago, New York.
Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Co., San Francisco, Calif.
Roebling's John A., Sons Co., Trenton, N. J
U. S. Steel Export Co., New York, N. Y.

**RUBBER AND RUBBER COMPRESSION TESTERS—**
Scott Testers, Inc., Providence, R. I.

**RUST PROOF COMPOUNDS—**
(See Compounds—Rust Preventing)

**RUST REMOVING COMPOUNDS—**
(See Compounds—Rust Preventing)

**SALTS—Heat Treating, Descaling, etc.**
Holden, A. F., Co., The, Detroit, Mich.
Houghton, E. F. & Co., Philadelphia, Pa.

**SATURATION SYSTEMS—**
Industrial Ovens, Inc., Cleveland, Ohio.
Watson Machine Co., Paterson, N. J.
Wire & Textile Machinery, Inc., Pawtucket, R.I.

**SOAPS—Industrial and Wire Drawing**
(See Compounds—Wire Drawing)

**SODIUM—for Descaling**
Du Pont de Nemours, E. I. & Co., Electrochemical Dept., Wilmington, Del.
Holden, A. F., Co., The, Detroit, Mich.

**SOLVENT RESIN SYSTEMS—Experimental**
Industrial Ovens, Inc., Cleveland, Ohio.

**SPOOLS—Stamped Metal for Retail Wire Sales**
Clark, J. L. Mfg. Co., Rockford, Ill.
Mason Can Co., East Providence, R. I.

**STAMPINGS—Steel**
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.

**STRIP—Steel**
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Roebling's John A., Sons Co., Trenton, N. J.
Youngstown Sheet & Tube Co., Youngstown, O.

**SWIFTS—Take-off**
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Watson Machine Co., Paterson, N. J.

**TANKS—Compound**
Haveg Corp., Newark, Del.
Watson Machine Co., Paterson, N. J.

**TANKS—Pickling**
Ceilcote Company, Cleveland, Ohio.
Chemsteel Construction Co., Pittsburgh, Pa.
Haveg Corp., Newark, Del.

**TANKS—Steel**
Chemsteel Construction Co., Pittsburgh, Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.

**TIES—WIRE—**
(See Wire Ties)

**TINNING PROCESS—**
Du Pont de Nemours, E. I. & Co., Electrochemical Dept., Wilmington, Del.
Metal & Thermit Corp., New York, N. Y.

**TINSEL—Cords, Decorative**
(See: Tinsel—Electric Conductor)

**TINSEL—Electric Conductor**
Montgomery Co., The, Windsor Locks, Conn.

**TINSEL—Electric Resistance**
(See: Tinsel—Electric Conductor)

**TINSEL—Lame, Silver and False Gold**
(See: Tinsel—Electric Conductor)

**TINSEL—Thread, Silver and False Gold**
(See: Tinsel—Electric Conductor)

**TINSEL—Thread, Decorative**
(See: Tinsel—Electric Conductor)

**TINSEL—Wire**
(See: Tinsel—Electric Conductor)

**TOOLS—Spring Forming**
Lundahl Corporation, Hartford, Conn.

**TOOLS—Wire Cutting**
Porter, H. K., Inc., Everett, Mass.

**TRAMRAIL SYSTEMS—**
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.

**TRAVERSES—For Reels**
Entwistle, Jas. L. Co., Pawtucket, R. I.
Hubbard Spool Company, Chicago, Ill.
Niles Steel Products Div., Republic Steel Corp. Niles, Ohio.

**TRAVERSE MECHANISMS—**
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attlebore, Mass.
New England Butt Co., Providence, R. I.
Niles Steel Products Div., Republic Steel Corp. Niles, Ohio.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y Inc., Pawtucket, R. I.

**TUBE BENDERS AND FORMERS—**
H. D. Kilmer Co., Cleveland, Ohio.

**VALVES & FITTINGS—Acid Resistant**
Haveg Corp., Newark, Del.

**VARNISHES—for Electric Wire**
N. E. Lacquer Co., E. Providence, R. I.
Standard Varnish Works, New York-Linden, N. J.-Chicago

**VULCANIZERS—**
Watson Machine Co., Paterson, N. J.

**VULCANIZING PANS—**
American Insulating Mach'y Co., Phila., Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.

**WELDERS—Spot and Butt**
Eisler Engineering Co., Newark, N. J.
Micro Products Co., Chicago, Ill.

**WIND-UP AND UNWIND SYSTEMS—Continuous**
American Insulating Mach'y Co., Phila., Pa.
Davis, R. L. Electric Co., Wallingford, Conn.
Entwistle, Jas. L. Co., Pawtucket, R. I.
Federal Manufacturing Co., Wallingford, Conn.
Industrial Ovens, Inc., Cleveland, Ohio.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc., Pawtucket, R. I.

**WIRE—Aluminum**
Elmet Division, North American Philips Company, Inc., Lewistown, Maine.
Malin & Co., Cleveland, Ohio.

**WIRE—Barbed**
Interlocking Fence Co., Morton, Ill.

**WIRE—Cast**
Youngstown Sheet & Tube Co., Youngstown, O.

**WIRE—Cold Heading**
American Steel & Wire Co., Cleveland-Chicago, New York.
Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Co., San Francisco, Calif.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Roebling's John A., Sons Co., Trenton, N. J.
U. S. Steel Export Co., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

**WIRE—Electric**
Malin & Co., Cleveland, Ohio.

**WIRE—Flat, Fine**
Elmet Division, North American Philips Company, Inc., Lewistown, Maine.
Montgomery Co., The, Windsor Locks, Conn.

**WIRE Manufacturers**
American Steel & Wire Co., Cleveland-Chicago, New York.
Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Co., San Francisco, Calif.
Continental Steel Corp., Kokomo, Ind.
Johnston Steel & Wire Co., Inc., Worcester, Mass.
Keystone Steel & Wire Co., Peoria, Ill.
Newbury Company, The, Boston, Mass.
Roebling's, John A., Sons Co., Trenton, N. J.
Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.
U. S. Steel Export Co., New York, N. Y.
Wickwire Brothers, Inc., Cortland, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

**WIRE—Music**
American Steel & Wire Co., Cleveland-Chicago, New York.
Columbia Steel Co., San Francisco, Calif.
Johnston Steel & Wire Co., Inc., Worcester, Mass.
Malin & Co., Cleveland, Ohio.
Newbury Company, The, Boston, Mass.
Specialty Wire Co., Inc., Worcester, Mass.
U. S. Steel Export Co., New York, N. Y.

**WIRE—Nickel Silver and Phosphor Bronze**
Malin & Co., Cleveland, Ohio.

**WIRE—Non-Ferrous to Specifications for Special Purposes**
North American Philips Co., Inc., New York, N. Y.
American Steel & Wire Co., Cleveland-Chicago, New York.

**WIRE—Spring**
Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Co., San Francisco, Calif.
Continental Steel Corp., Kokomo, Ind.
Johnston Steel & Wire Co., Inc., Worcester, Mass.
Keystone Steel & Wire Co., Peoria, Ill.
Newbury Company, The, Boston, Mass.
Specialty Wire Co., Inc., Worcester, Mass.
U. S. Steel Export Co., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

**WIRE—Stainless Steel**
American Steel & Wire Co., Cleveland-Chicago, New York.
Columbia Steel Co., San Francisco, Calif.
Firth Sterling Steel & Carbide Co., McKeesport, Pa.
Specialty Wire Co., Inc., Worcester, Mass.
Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.
U. S. Steel Export Co., New York, N. Y.

**WIRE—Steel—Also Coppered Steel—Also Galvanized Steel**
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Johnston Steel & Wire Co., Inc., Worcester, Mass.
Keystone Steel & Wire Co., Peoria, Ill.
U. S. Steel Export Co., New York, N. Y.
Wickwire Brothers, Inc., Cortland, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

**WIRE—Straightening and Cutting**
Pittsburgh Cut Wire Co., Pittsburgh, Pa.
Wickwire Brothers, Inc., Cortland, N. Y.

**WIRE—Tungsten**
North American Philips Co., Inc., New York, N.Y.

**WIRE—Zinc**
Platt Bros. & Co., The, Waterbury, Conn.

**WIRE CLOTH—Industrial**
Roebling's, John A., Sons Co., Trenton, N. J.
Wickwire Brothers, Inc., Cortland, N. Y.

**WRAPPING PAPER—Creped**
Crepe-Kraft Company, The, Division National Waterproof Papers, Inc., Newark, N.J.

**YARNS & TAPES—**
Du Pont de Nemours, E. I., Co., Wilmington, Del.
Glass Fibers, Inc., Waterville, Ohio.
Owens Corning Fiberglas Corp., Toledo, Ohio.
Twitchell, E. W., Philadelphia, Pa.

**YARN TESTERS—**
Scott Testers, Inc., Providence, R. I.

# The WATSON MACHINE COMPANY

ESTABLISHED 1845

**PATERSON 3, NEW JERSEY, U. S. A.**

**ELECTRICAL WIRE AND CABLE, WIRE ROPE AND CORDAGE MACHINERY MANUFACTURERS**

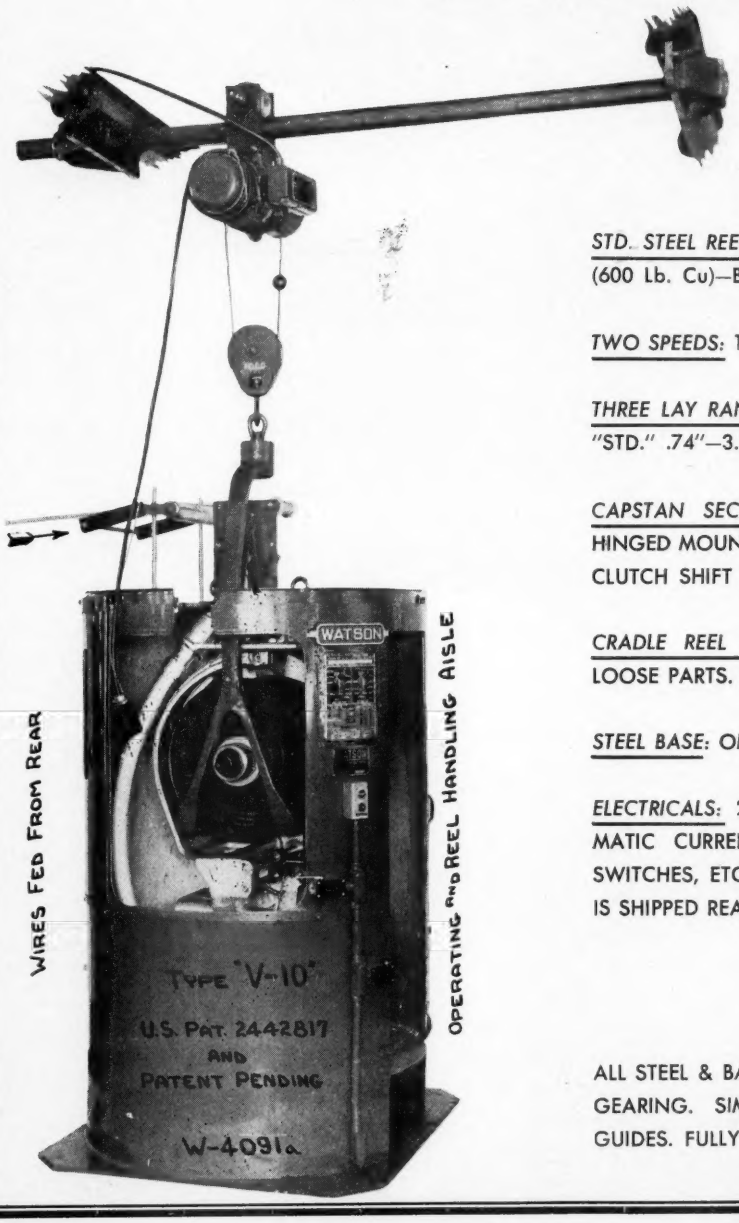
**WATSON**

## THE NEW "V-10" BUNCHER

U. S. PATENT 2,442,817 AND PATENT PENDING

**A HEAVY DUTY—LARGE CAPACITY—HIGH PRODUCTION—MINIMUM SPACE UNIT.**

DESIGNED TO MEET THE DEMAND FOR ROW MOUNTED MACHINES CAPABLE OF LONG RUNS OF FINE STRANDS — BUT — ALSO SUITED FOR HEAVY BUNCH STRANDS AND IDEAL FOR GALVANIZED STEEL CLOTHESLINES AND SIMILAR STRANDS.

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*STD. STEEL REELS:* 24" x 14" (1000 Lb. Cu) AND 22" x 11" (600 Lb. Cu)—BOTH 5" BORE.

*TWO SPEEDS:* 1450 & 965 TWISTS PER MINUTE.

*THREE LAY RANGES:* SPECIFY WHICH. "LOW" .59"—3.01". "STD." .74"—3.76". "HIGH" .89"—4.51".

*CAPSTAN SECTION:* HEAVY DUTY DOUBLE GROOVED. HINGED MOUNT SIMPLIFIES LAY GEAR CHANGE. EXTERNAL CLUTCH SHIFT SIMPLIFIES HAND OF TWIST CHANGE.

*CRADLE REEL MOUNT:* OVERHUNG SPINDLE TYPE. NO LOOSE PARTS. SAFETY LOCK.

*STEEL BASE:* ONLY 52" x 52".

*ELECTRICALS:* 2-SPEED MOTOR AND CONTROLS, AUTOMATIC CURRENT-OFF BRAKE, ELECTRIC STOPS, SAFETY SWITCHES, ETC. INSTALLED AND WIRED BY US. MACHINE IS SHIPPED READY TO RUN.

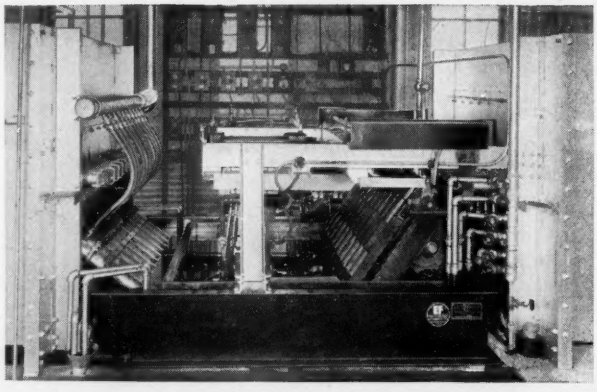
★ ★ ★

ALL STEEL & BALL BEARING CONSTRUCTION, OIL HOUSED GEARING. SIMPLEST THREADING TUNGSTEN CARBIDE GUIDES. FULLY GUARDED.

# HEAT TREATS SHELL FORGINGS—SCALE FREE

● The above illustration shows shell forgings being pushed through an EF gas-fired hardening furnace in parallel tubes filled with protective atmosphere. The forgings are then quenched automatically—reversed without coming in contact with air—and loaded into the tempering furnace. The finished forgings are uniform, free from scale—meet all specifications. The output is high—the labor requirements, low.

Let EF engineers with their complete facilities, long experience and the "know-how" gained on hundreds of shell, aircraft, tank, gun, bomb, cartridge clip, ammunition and other projects, help you convert to defense production. Write us about your change-over problems.



**Showing Discharge End of the Hardening Furnace—the Quench, Automatic Reversing, and Loading into the Tempering Furnace Without Coming in Contact With Air.**

EF

***Gas-Fired, Oil-Fired and Electric Furnaces***

***for any Process, Product or Production***

**THE ELECTRIC FURNACE CO.**

WILSON ST. at PENNA. R. R. *Salem - Ohio*